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## THE MADRAS GEOGRAPHICAL ASSOCIATION, MADRAS

*Rules.*

1. The name of the Association shall be *The Madras Geographical Association.*

*Objects.*

2. The objects of the Association shall be :—
   (a) To promote and diffuse geographical knowledge ;
   (b) To secure for geography its proper place in schools, colleges and universities ;
   (c) To help to improve the methods of teaching geography ;
   (d) To help geographical studies about India.

3. These objects shall be secured by :—
   (a) Holding meetings and conferences ;
   (b) Publishing a Journal and other occasional publications;
   (c) Organizing geographical exhibitions and excursions ;
   (d) Helping in the preparation of geography books in the languages current in India ;
   (e) Forming a central library of geographical literature, and collecting maps, charts, plans, models, slides and instruments ;
   (f) Providing for circulation to members of books, periodicals, and other collections ;
   (g) And by such other ways as are deemed necessary to promote the objects of the Association.

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4. The membership of the Association shall be open to all those who are interested in the promotion of geographical knowledge.

5. There shall be two classes of members, full and associate.

6. Full members may be honorary, life or ordinary.

* * * * * * * * * *

9. A person shall become an ordinary member or an associate member upon the proposal by a full member, the seconding by another full member and approval by the Executive Committee by the majority thereof present at its meeting.

10. An ordinary member shall pay an entrance fee of rupees two along with his application for membership and an annual subscription of rupees six.

11. Associate members shall be exempt from any entrance fee ; and they shall pay an annual subscription of rupees two.

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OFFICE OF THE
MADRAS

The Journal of
The Madras Geographical Association

Vol. XIII | June 1938 | No. 2

# The Technique of Regional Geography, with Special Reference to India*

By

Prof. A. G. Ogilvie, O.B.E.,
*University of Edinburgh*

At no time in the history of India have those responsible for her government been more concerned than they are to-day for the welfare of the vast population as a whole. In relation to the measures they devise for the direct improvement of physical conditions of life, and so indirectly for the moral betterment of the masses, they have a right to demand from workers in the various branches of science the greatest contribution that they are able to make. Now I am well aware that in its scientific as in its administrative Services the Government of India is as well equipped as any government disposing of comparable financial resources. But there is as yet no organised service rendered to India by geography, that is by geographical science as this is now interpreted; and I propose to indicate one way by which Indian geographers, as it seems to me, could make a notable contribution to the future welfare of their compatriots. There is, moreover, another important aspect of the question. Geography must live up to its name which is now held to connote not merely bald and empirical Earth-description, but description that is explanatory and interpretative and which above all seeks to relate the physical environment with the human community. In this task geographers have in India almost a clear field if they are to discard vague generalisations which, though useful in arousing interest, are harm-

* Read at the Silver Jubilee Meeting of the Indian Science Congress Association, Calcutta, January 1938.

ful in the complacency they encourage; they also evoke criticism of the subject that is well justified.

In my Presidential Address to Section E (Geography) of the British Association for Advancement of Science,[1] in 1934, I dealt with a movement relating to Inter-Tropical Africa with which I was closely concerned, an effort to accumulate results of research upon the relation of the life of the natives to their local environment. I indicated the immense difficulty of the subject in view of the scanty knowledge we possess regarding the physical environment itself; even the topographic map is lacking for most regions. But I was able to describe, in a coherent though tentative manner, the results of co-operative observations by non-geographers working on a plan made by geographers for almost the whole of Northern Rhodesia. In concluding the address I suggested that the co-operative method might well be adopted with much greater success elsewhere, and I referred to India as an example in these words:—"In spite of voluminous official and other literature, we have still a great deal to learn of the geography of man in the sub-continent. Although the task of gathering the information there would be much more complex than in the case of Africa there would be certain offsetting advantages. Among these are: the accuracy of the map of India, the existence of a great body of data created by the various scientific services and a wonderful census organisation." By the greater complexity of the task in India as compared with Africa I referred, of course, to the much greater density of population, and the much higher status of Indian agriculture and other occupations, as well as to the long history of settlement, religion, and social organisation.

Several general accounts of the geography of India have been published in recent years. They vary in character and merit, but they all differ essentially from works of similar size on the continent of Europe. These latter rest firmly upon numerous detailed monographs on the regional geography of the constituent areas. But such treatises so far scarcely exist in India. Nevertheless there is ample indication that Indian geographers have realised the need, and a number of them are probably engaged upon studies of the desired character. Three essays of some length which have been published represent a large step forward. I refer to the works

1. *Co-operative Research in Geography; with an African Example*, British Association, Annual Report 1934, also Scot. Geog. Mag., Vol. 50, 1934, pp. 353-378.

by M. B. Pithawalla on the Lower Indus Basin,[2] by S. P. Chatterjee on the "Meghalaya" plateau (or approximately the Shillong plateau),[3] and S. D. Pant on the Kumaon Himalayas.[4] The first is as yet incomplete; the other two while each possessing many excellent features fall somewhat short of the ideal balanced regional account. The book by Pant does not indeed claim to be geography; yet in regard to the modes of life it deals with just those questions in which geographers are most interested; it fails to satisfy because physical factors are inadequately treated and because nc reliance has been placed upon mapping the human phenomena which receive such full verbal description. In Southern India the activities of the Madras Geographical Association give evidence of real enthusiasm for geography among its members. By co-operative effort the Association has published four groups of papers relating respectively to Malabar[5] and to the districts of Trichinopoly,[6] Anantapur,[7] and Salem[8] while regional papers have been presented on the Vellar Basin by K. Srinivasaraghavan,[9] and the Amaravathi Basin by C. S. Subbaratnam.[10] With the Calcutta Geographical Society in being we shall doubtless soon see similar published work relating to this region. While recognizing the value of these as examples of pioneer effort I would urge more Indian Geographers to embark upon works of a synthetic character dealing with their regions small and large, and thus eventually to lay a new foundation for the treatise of more comprehensive type which will place our understanding of India on an altogether different plane.

## A REVIEW OF EXISTING MATERIALS

Geographers who have experience of the kind of work in view are of course well aware of the data that already lie to their hand, and it would be an impertinence on my part to draw attention here

2. *A Geographical Analysis of the Lower Indus Basin;* Part, I, Karachi, 1936.

3. *"Le Plateau de Meghalaya (Garo-Khasi-Jainta): Etude geographique dune de l'Inde*; Paris, 1936.

4. *"The Social Economy of the Himalayans, based on a survey of the Kumaon Himalayas,"* London 1935.

5. Journ. Madras Geog. Assoc. Vol. 6, 1931-32, Nos. 3 and 4.

6. Journ. Madras Geog. Assoc. Vol. 8, 1933, No. 3.

7. Journ. Madras Geog. Assoc. Vol. 9, 1935, No. 4.

8 Journ. Madras Geog. Assoc. Vol. 11, 1936, No. 2.

9. *A Geographical Study of the Vellar Basin, ibid.* Vol. II, 1936, pp. 213-234.

10. *Human Geography of the Amaravathi Basin, ibid.,* pp. 27-41.

to the chief categories or even to suggest methods for their use, were it not that the fruits of European experience ought, as I think, to be put more readily at the disposal of Indians than has been the case hitherto. This at any rate is my excuse, and my suggestions are made in this spirit with all diffidence proper to one without personal knowledge of India. I should perhaps add however that the genesis of this paper is the result of several years' observation of the work of students, some of them from India, who have been asked to study Indian Districts from published maps and reports under the direct guidance of Dr. Arthur Geddes who has lived in this country. I wish now to acknowledge Dr. Geddes' help in the preparation of this paper.

Fundamental in all geographical work is the map; and I need not stress either the immense value of the topographic maps of India or the debt that we owe to all those who have had a part in their construction. I can express with some personal knowledge my regard for the conscientiousness of Indian surveyors, since a number of them shared with me the task of map production in Macedonia in the Great War. With the admirable "one-inch" sheets of the modern editions, where these are published, the Indian geographer starts at a great advantage. He can rely absolutely upon the distributions of land and water-forms, of settlements, and within certain limits, of land utilisation. All the maps which the geographer himself will construct will rest on this sound frame work. Comparable with the modern maps as assets of first order are the District Gazetteers, the Census Reports, the Agricultural Reports, and for the regions for which they are available, the Settlement Reports. As Lord Meston has well pointed out,[11] the Settlement Reports are of such high value to the geographer that one wishes they were more readily available in Britain. They are not of course all of equal geographical utility; the inclusion of maps in some of them adds to the value of these. I propose to deal later with certain uses for various documents, but I should point out here that the Gazetteers correspond exactly to their title. For the geographer they form mines of information usually admirably written, but they are not "regional geographies;" distributions throughout each District are described only in vague terms and reference to correlations are usually only implicit, if mentioned at all. Moreover the Gazetteers are generally extremely brief in their accounts of the physical environment. Another valuable source is the vil-

11. The Geography of an Indian Village, Vol. 20, 1935, pp. i-ii.

lage monograph of which examples from the Dekkan and the Punjab are notable.[12]

The greatest difficulty which will face the Indian geographer for some time to come is the adequate description and interpretation of land forms and the proper use in regional geography of the facts of geology and geomorphology; and this difficulty is by no means confined to India. In most respects the publications of the Geological Survey, where they have appeared, give far more data than the geographer requires, but as a rule the treatment of land forms is inadequate for his purpose, since the study of geomorphology is not the chief aim of the Survey. Probably the best course in the near future is to try to persuade geologists to devote some of their spare time, if they have any, to the systematic description of Indian land forms. It must be noted, however, that official records have been amplified from time to time by other geomorphologists: e.g. S. W. Cushing on the eastern coastal plain,[13] J. Carl on the southernmost area of the Peninsula,[14] and N. Krebs on its western and southern parts,[15] while a further series could be cited dealing with the Himalayas.

But whatever be the source of his morphological data the geographer must practice the art of careful selection of facts from technical works, omitting those that are not to be correlated with other phenomena. Furthermore it is, I think, in this morphological aspect above all that geographers need to cultivate conciseness and system in their description and to give attention to the proper use of accepted terminology. Whatever we may think of the methods, theories and nomenclature of the late William Morris Davis we must regard him as a master of succinct expression in his explanatory accounts of land-forms. The difficulties mentioned are serious in regard to the Dekkan and more so in the mountains; description of the plains, from their relative uniformity of surface, would perhaps suggest an easy task. But there are many pitfalls for the untrained observer in the vagaries of rivers in allu-

12. H. H. Mann (and others), "Land and Labour in a Deccan Village, London I.

13. The Geography of Godavari, Bull. Geog. Soc. Philadelphia, Vol. 9, 1911, pp. 169-187, also the East Coast of India, Bull. Amer. Geog. Soc., New York, Vol. 45, 1913, pp. 81-92.

14. Dans les massifs montagneux de l'Inde meridionale Le Globe, Geneva, 1930.

15. Morphologische Beobachtungen in Sudindien, Sitzb. Preuss. Akad. Wissens., Vol. 23, 1933.

vial plains where slight differences of slope and height mean much and where periods of dissection and aggradation may have alternated. On the other hand the changes are relatively rapid, and historical records often indicate the nature of the later phases. The substantiation of such evidence by careful observation is much to be desired.

In a country with a markedly seasonal rainfall and a people overwhelmingly dependent upon agriculture no physical aspect of the geography is more important than the hydrography; and it must be correlated with rainfall and temperature on the one hand and sub-soil and soil on the other. There is evidently a vast body of information readily available on each of these subjects separately, but their interrelations will often have to be made clear with the help of additional personal observation by the geographer.

In the preparation of future regional descriptions of India I would plead especially for the employment of two types of technique. The first is almost too obvious to require mention but it is of great importance. I refer to the careful plotting of all distributions studied, the "one-inch map" being used as far as possible and especially where field work is requisite. The second consists in the careful recording of the rhythmic change of scene and of human occupation throughout the year as related to the weather sequence and to water conditions of the surface and sub-soil. I propose now to elaborate each of these techniques in turn.

I will outline the character of distributions which require detailed mapping, first those which depend entirely upon observation in the field and next those which represent in their first stage cartograms plotted from published statistics. These must be afterwards revised in the field to obtain as nearly as possible the real distributions unrelated to administrative boundaries.

Many of the maps that depend entirely upon field work relate to the physical environment. Thus a classification of soils and their distribution is necessarily the work of the expert. The soil map is almost as fundamental as the topographic map and it is to be hoped that the project of widespread soil sampling now in progress at the Imperial Agricultural Research Institute will soon be followed by a real soil survey. It seems clear that the Institute has not yet reached conclusions regarding the soils of India such as can be used by geographers. Closely affecting this is a map showing areas where the different physical processes are at work, as for instance :—erosion by gullying and by sheet flood and the relation of the vegetation cover to these phenomena; annual and occasional deposition, with notes on the character of the deposit,

from silt to gravel or shingle; weathering of various types; depth of the water-table at the different seasons; formation of *kankar* and other soil crusts associated with evaporation; extent and period of inundation. Most of the facts thus to be recorded have a direct or indirect bearing on human life; moreover science would be greatly enriched if they could be depicted on maps covering considerable areas of India. For example, careful attention to the erosion processes will lead to definition of ideas as to the effect of *process* upon *land form*; it is most important to determine if possible the proportion of the year in which mechanical processes and chemical processes respectively are effective, for thereby a correlation may be effected between climatic and geomorphological data. Himalayan districts call for certain types of mapping not applicable elsewhere; I will mention only one phenomenon as an example, the duration and depth of the cover of snow. This last is one of the aspects of climate and I do not propose to deal with the nature of existing records of Indian climates. But I would suggest that in countries with the best meteorological organisation there is still room for valuable supplementary observations upon local climates.

The second category of maps, those founded upon statistics, relate chiefly to man and his production. I may begin by giving a list of the phenomena for which values exist for administrative units, and appearing at regular intervals of time ; all of these can be used first for the making of cartograms, and then be given a greater degree of reality by scrutiny of maps of topography, soil, inundation etc., when these have been made. They are:—population density; population change between censuses and including periods longer than a decade; avèrage population per village; diseases of the population; density of cattle and other animals; land utilisation.

By the help of the "one-inch" maps the general character of the distribution of settlements can be seen, and the distribution of type of village, always referred to in Census Reports could be actually defined. The type of village plan involves closer field study to be correlated, say, with the Land Record maps on the scale of 4 inches to 1 mile which however are printed, I think, for vernacular use only. While plans are recorded in certain village studies, the only attempt to interpret them appears to be that of A. Geddes in Bengal.[16] Again the homestead types characteristic

16. *Au Pays de Tagore : la civilisation rurale du Bengale occidental et ses facteurs geographiques*, Paris, 1927.

of caste and occupation, region by region, required correlation with the village plan. Such work has been done in immense detail elsewhere as in Egypt,[17] Annam[18] and Cochin-China[19] but A. Demangeon has shown that the simplest minimum of observation is of great use.[20] To take an Indian example :—the circular house of the Telugu country is contrasted with the long-shaped Oriya house, and this with the rectangular Bengali type. Have the distributions of these been recorded and exactly mapped, and if so do the boundaries correspond exactly with the limits of language ?

Of all these maps the most fundamental is that of population density, for in a long-settled country like India it generally reflects the carrying capacity of the land under present methods of agriculture and standards of living. No effort should therefore be spared to make it represent the facts as truly as possible on the scale selected for the map. It is most desirable to obtain a density figure within the limits of all small areas that are uniform in the character of their environment, and so to be able to make useful comparisons with other regions of India. Therefore the method of representing population by dots, if it be used at all should be supplemented by a map in which density is graded by tints or rulings. I am not however pronouncing in favour of the so-called contour method, in which I do not believe. The method of mapping that seems best suited to those parts of India for which new surveys have been published is that which was experimented in 1920 for Mexico using maps of relatively poor quality ; this has been independently developed by A. Geddes for Bengal, with first class maps and I would strongly recommend Indian geographers to study his account of it[21] and to apply the method to other regions. While Geddes possessed that local knowledge the mapping was actually done in Edinburgh on the scale I/M from the census of population by *thanas* and scrutiny of all the topographical maps, either " half-inch " or " one-inch," of which there are some 600 for Bengal and its borders. The choice of the

17. J. Lozach and G. Hug, *L' habitat rural in Egypte,* Cairo, 1930.

18. C. Robequain, *he Thanh Hoa,* Paris and Brussels, 1929.

19. P. Gourou, *Les paysans du delta tonkinois, etude de geographic-humaine,* Paris, 1936.

20. *La geographic de l' habitat rural, Annales de Geog.,* Vol. 36, 1927, pp. 1-23 and 97-114.

21. *The Population of Bengal, its distribution and changes ; a contribution to geographical method,* Geog. Journal, Vol. 89, 1937, pp. 344-368.

I/M scale for this population map was determined by its convenience in showing Bengal on one sheet,[22] and it may seem that the disparity between the scales of the survey sheets used and the completed map is too great, involving as it does a reduction by nearly 16 times from the "one-inch." Inspection however of the published excerpt of the map which is unfortunately only inadequately reproduced in black will indicate the great amount of detail that may be included by the use of this scale. Furthermore the fact that this successful experiment has been made seems to me to have special importance at the present time. Geographers everywhere would welcome the publication of a map of Indian population on this scale; it would be a document of immediate and great value to us, and I believe it would soon prove its value in India in various ways. Its preparation however demands the co-operation of many workers and obviously the first edition of the map could not be of uniform accuracy in view of the present state of surveys in the country. But this criticism may be levelled at almost any map series covering a sub-continent. India has good reason to be proud of her Census organisation, and it is perhaps not too much to hope that the Census may develop its present cartogram illustrations a stage further. Some advantage would be gained by what would seem to involve only a slight amount of additional work if for those parts of the cartograms in which large administrative units are used, smaller ones were substituted the more obvious false averages would thus be avoided. It would be still better if in the preparations for the 1941 Census geographers could be consulted and arrangements made for the drawing of the best possible rational population map on the scale of I/M.

But to return to my theme of regional studies; the geographer working on a given region will usually need to examine earlier distributions of population if he is to recognise the changes in land utilisation and the relations of social progress and decline to local environment. A. Geddes has made an interesting experiment in showing population density and change for Bengal on the same map.

The first step in the preparation of Geddes' density map of Bengal was the compilation, on the same scale, of a map showing the topographical features that are most potent in determining the distribution of the people—principally cultivated land distinguished

22. He has since extended the map to cover Bihar and Orissa.

from the forests and the swamps but including the distinction between old and recent alluvium. In other regions of India different elements of the physical geography would have to be introduced from the categories already listed; for example, in north-western India—sand dunes, and in many semi-arid areas—" badlands." While some technical skill in selection and generalisation of features is requisite in the making of such a map the work presents no real difficulty in the regions adequately surveyed, and is a task for the map draughtsman. Thus, working back from the much desired population map I am led to hope that the Survey of India may be induced to prepare a supplementary edition of its excellent I/M map, omitting the layer colours and showing instead the features which, apart from relief are of direct importance in the geography of man. The map could be rapidly completed for all parts with new surveys and issued as a preliminary edition.

As in the case of the census figures for population so the data of agricultural areas and production relate to administrative areas. The geographer with local knowledge and using all information contained in Reports of Agricultural Officers aims at identifying and mapping the real limits of each group of crops, of differentiating on his maps land devoted to crops at the various seasons of the year and so on. In these processes he may with advantage apply the methods employed by Geddes for population, and he will of course be greatly helped by the close descriptions given in the Settlement Reports. But one is inclined to ask whether Settlement Officers would themselves be willing, as they would certainly be able with but slight revision of their records, to prepare certain maps for publication, perhaps by the new geographical Societies in Madras and Calcutta.

The geographer, having dealt with each agricultural element in his region, is in a position to prepare a synthetic map classifying the land according to:—first, various agricultural types, and secondly intensity of production. Working upon another set of statistics, those of land values, he may map these first as a cartogram and then more rationally and so obtain a valuable correlation demonstrating the degree in which physical environment affects the various elements mentioned. The small minority of Indian population still practising the more primitive forms of agriculture require special consideration since the land under cultivation is constantly moved. From the Settlement Reports alone it must be hard, one would think, even for an experienced administrative

officer new to a district to visualise clearly the sequence of movements in the case of each village, the period of cultivation of given gardens, and to be able to state the specific area of country thus used by the villagers; it would seem to be still harder for the official of the Secretariat as it certainly is for the "arm-chair" geographer at a distance, and hardest of all for the lay reader. I understand that forest officers where they now control the *jhum* system have this information, though it is not published. Elsewhere it would form a suitable subject for investigation by geographers.

Health statistics are immensely important in the interpretation of human life region by region. The geographer owes much to men of wide vision like Sir Patrick Hehir and D. C. A. Bentley in Bengal for their map study of malaria, etc.,[23] not merely on account of their mapping of health or disease, but for the bold way in which they have attempted reconnaissance surveys of environmental factors—drought or flood, forest, field or swamp. Yet it would certainly be true to say that the geographer could render them valuable service in return by putting together into a more accurate regional synthesis these environmental factors that are so obviously basic to human life in India. These medical pioneers have themselves pointed out that their correlations are as yet only tentative because of inadequate geographical survey and synthesis and have insisted that such a synthesis is essential to a study of the basis of human life, or nutrition and well-being, or of deficiency and disease, of high mortality and population decline. Environment itself of course is not everything and even high productivity of agriculture per acre and per family may go with inadequate subsistence for a portion of the community. Injustice and suffering will result to them, and almost certainly loss and infection by disease to the whole community. Here then the results of the economic surveys included in the Settlement Reports are of the greatest value: some of them stand out in this respect, as *e.g.* those by J. C. Jack for Bakarganj and Faridpur. Yet again one could wish that further correlation of their results could be made in a regional way through accurate localisation of the facts.

At this point I wish to allude to a valuable adjunct to the map in clarifying ideas as to the relation of man to the land. It is the use of diagrams of different types. In explaining the struc-

23. C. A. Bentley, *Malaria and Agriculture in Bengal,* Calcutta, 1925. P. Hehir, *Malaria in India,* London, 1927.

ture the geologist has recourse to the section in two dimensions equally with the map. The geomorphologist readily recognises the great contribution of W. M. Davis in developing the block diagram in three dimensions which includes one or more geological sections as well as a generalised view of the salient land forms.[24] For our purpose both diagrams have their use. The drawing of good block diagrams however whether schematic or more accurate where drawn from the map, requires considerable technical skill. But any one can draw many typical profiles from a region and insert on them the principal data of settlement and land usage in relation to altitude, slope, soil type, water conditions, etc. Fig. 1 is an example of a generalised profile showing the facts for the Hazaribagh region, Bihar.[25]

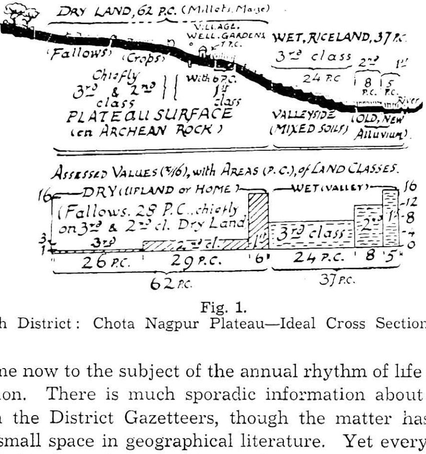


Fig. 1.
Hazaribagh District: Chota Nagpur Plateau—Ideal Cross Section of Valley

I come now to the subject of the annual rhythm of life and work in a region. There is much sporadic information about this contained in the District Gazetteers, though the matter has hitherto claimed small space in geographical literature. Yet every one who has used his eyes in any district during one year has some knowledge of it. What is needed besides additional observation of the facts in various regions is the systematic recording of the data upon an agreed plan. The results of such organisation would provide a working basis for comparisons in the material life of the people of India as affected directly by the average sequence of

24. cf. Cushing ref. supra p. 7.
25. Kindly drawn for this paper by A. Geddes.

weather and also by tradition. I wish to suggest that however the verbal description of the seasonal occupations is treated, geographers in India should not fail to make free use of the graphic diagram which has been found elsewhere to be an excellent means

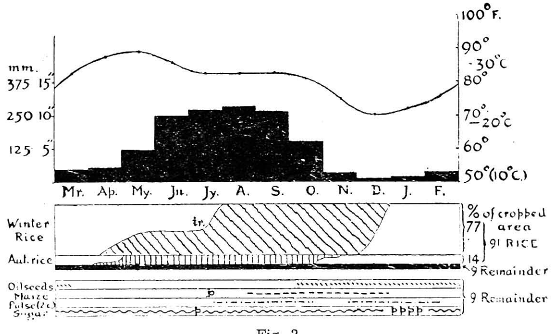


Fig. 2.
Diagram of the Annual Rhythm of Cultivation (ergograph) in Orissa (Balasore District) in relation to mean temperature and rainfall, after Arthur Geddes.
The crop area is shown as percentage vertically, the crop season horizontally from sowing to harvest. p.—one ploughing, tr.—transplanting.

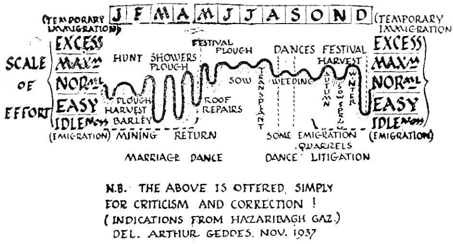


Fig. 3.
Seasonal Rhythm of Effort—Northern Chota Nagpur Plateau.

of summarising the information. The diagram in question has been termed " sociograph ", though " ergograph " propopsed by Geddes as avoiding hybrid etymology and concentrating upon the year's work, seems better. These diagrams of which figs. 2 and 3 are examples show the mean climatic data, general temperature and

rainfall for each month and, usually beneath these, some notation indicating the agricultural or other operation throughout the year.[26]

In regard to India it is important that a separate graph be made for each of the land types that have been recognised from the studies already alluded to, since otherwise the graph is made to carry more than it will bear and so to lose its utility. It will readily be realised that such "ergographs" constructed for similar types of land throughout India will possess an almost synoptic value, since they can be rapidly scrutinised and compared. In India such graphs would record chiefly the work rhythms of settled agricultural popution occupying a uniform type of land. .But people with other modes of life have to be considered. True nomads do not, I think, occur, yet there are groups who practise considerable annual migrations, and for these useful graphs of another type should be constructed. I refer in particular to the Himalaya and other high mountains of India where seasonal movements through considerable ranges of altitude take place. Here again the Settlement Reports form a mine of information. These and other sources have recently been supplemented by two Indian observers in published

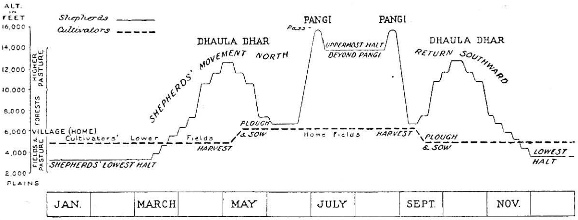


Fig. 4. Diagram of the seasonal movements of the Gaddis devised by W. M. Day to illustrate the account by I. D. Malhotra.
*(Courtesy of the Scottish Geographical Magazine.)*

works. The former in the book by S. D. Pant (v.s.), contains a very full statement. But I will refer to the much briefer account of the Gaddis of Dhaula Dhar by I.D. Malhotra,[27] because it contains an appropriate diagram reproduced here (Fig. 4). The Gaddis whose typical villages are at an altitude of some 6000 ft. cultivate

26. See also L. Garrard on the Andaman Islands in *Studies in Regional Consciousness and Environment*, London, 1930.

27. *A Tribe of the Western Himalayas: The Semi-Nomadic Gaddis of Dhaula Dhar.* Scot. Geogr. Mag., Vol. 51, 1935, pp. 14-21.

fields near their homes as well as in the valleys some 1000 ft. lower; and so the tillers oscillate. The shepherds on the other hand move 3000 feet downwards to the plains in the winter and in summer northwards to beyond the Pangi Range by passes of over 15000 feet. These two sets of migrations have been summarised in a simple graph of the kind which I think was first used by J. Brunhes and P. Girardin in their study of the Val d'Anniviers.[28] Nowhere in the world are the small natural regions more sharply separated than in the Himalayas. Each valley system is the home of a distinct society, so that the Himalayas are like a museum for the anthropologist. Here then is a great future opportunity for the geographer also to record exactly the relation of these hill folk to their territory, up to the highest pastures, and the nature and extent of their contacts with India and with the plateaus beyond the mountains. Unfortunately an exact record is possible to-day for only a few areas since topographic maps are for the most part insufficiently detailed. Furthermore I fear that the strenuous field work will not appeal to many whose homes are on the plains of India. But a willing and adventurous spirit may well overcome weakness of the flesh; and the task is certainly a worthy one. I would suggest in relation to the Himalayas that time would be well spent in ascertaining for what areas some work specially helpful has already been done and that complete regional descriptions of these regions be attempted first. In addition to the types of official publications alluded to throughout this paper, which are the more uniform sources of information the publications of the Geological Survey will doubtless be found to yield geomorphological data varying in amount for different parts, and in this field another fruitful source is the Journal of the Royal Geographical Society and now perhaps the Himalayan Journal. On another aspect of the environment, the vegetation, I would draw attention to J. M. Cowan's,[29] ecological survey of the forests of Kalimpong in which the relation of plant associations to climate and other factors is clearly stated, and a "one-inch" vegetation map published. On Cowan's map the agricultural areas are left blank. In Pant's book on Kumaon the maps are the merest sketches. Here then are two clear invitations to the geographer to put in some field work in the valleys of the Tista and the Kali to supplement the valuable data already collected. Many

28. *Annales de Geog.*, Vol. 15, 1906.

29. *The Forests of Kalimpong: an Ecological Account.* Rec. Bot. Surv. India, Vol. 12, No. I, 1929.

European geographers would welcome these and other opportunities of regional studies in India. But given a good technique I feel that the work can be better done by Indians.

In conclusion, the mention of one's colleagues in Europe suggests to me an idea that might well be developed : that of forging some permanent link between the geographers of Europe and those of India as they become more numerous. It is true that a number of Indians have worked in the geography departments of European universities, but they have usually come as young graduates before they had had experience of geographical field-work in their own country, and this seems to me unfortunate. The technique of geological mapping may be learned in any country of sufficient structural variety ; georgraphy is different in that it is primarily concerned with man, and the human conditions in Europe and India are widely diverse.

When I refer to the help which European geographers might give in promoting geographical research in India I naturally think primarily of British geographers since the contacts are necessarily already closer than they are elsewhere. I believe then that the time is ripe for some systematic and fruitful co-operation. If it were possible for one or two of my British colleagues to spend a year in this country studying vital regional problems along with a select band of Indians composed of both relatively senior men and younger assistants, it appears to me that excellent results might well accrue both from the personal contacts made and from the discussions in the field when confronted with the realities, the varieties and the complexities of Indian environment and the human responses to it. To accomplish such a co-operative effort the British geographers and the larger number of Indians would have to be released for a period from their normal duties. For this financial help would be needed, and a possible source has occurred to me. The anonymous donor of the large sum of money recently handed to Earl Baldwin and converted by him into an Imperial Trust expressed his hope that India would not be excluded from the benefits of whatever scheme might be adopted. I do not know whether any scheme has yet been formulated, but in relation to India I can think of no more fruitful aim than that of promoting fuller understanding of Indian problems by the British people on the one hand and by educated Indians themselves on the other. These problems to be seen "whole" must first be approached from the standpoint of geography. The proposal I have made is for an experiment that would cost little but which might well bear valuable fruit. I need say no more.

# Population and its Distribution in Kerala

BY

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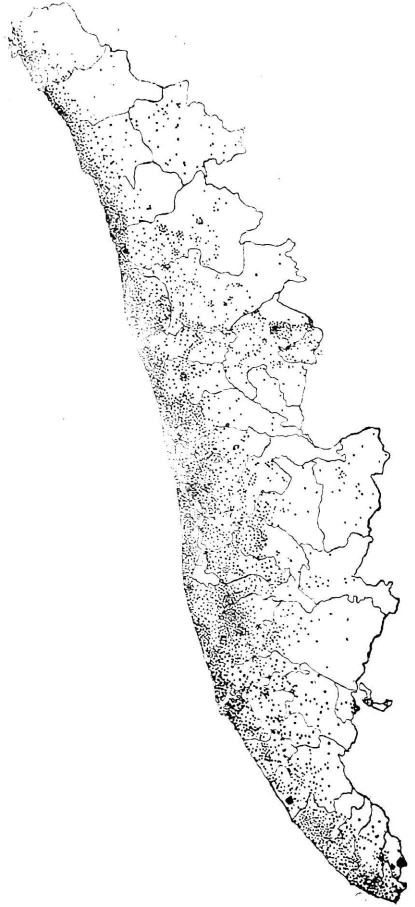
From ancient times, the southern part of the country lying west of the Western Ghats has been designated Kerala and that is the name by which the Malayalees love to call their native land. In popular parlance at the present day it denotes that region where Malayalam is the predominant language. Kerala has a certain peculiarity of its own ; it lies on the south-western corner of India, cut off from the East Coast and the Deccan by the barrier of the Western Ghâts which is broken only in two places within the region: (1) in the Palghat Gap utilised by the South Indian Railway and (2) in the Aramboly gap in the south, utilised by the Nagercoil—Tinnevelly Road. (At Tenkasi, the height of the Ghats diminishes, and the South Indian Railway tunnels through this region.) Its isolation possibly explains certain peculiaritics in customs, manners, mode of dress (especially of women), devolution of property etc. Climatically the whole of the West Coast (including the Konkan region) is clearly different from the rest of India. The rainfall in this region is ordinarily heavy and the crops hardly need the help of irrigation (except in Nanjinad in the extreme South of Travancore, in Shencotta and in the Chittur Taluk of Cochin). Although the District of South Kanara has much in common with Kerala, both climatically and geologically, yet the language is Kannada, which has little in common with Malayalam, the customs, manners, mode of dress (especially of women), the devolution of property etc., are all different. It has therefore been considered advisable to limit the scope of this paper to the cultural region of Kerala.

The region of Kerala extends from 8°-4′ N to 12°-18′ N and 75°-14′ E to 77°-25′ E. It is bounded on the north by the district of S. Kanara, on the east by the native state of Mysore, and the districts of Coorg, Nilgiris, Coimbatore, Madura, Ramnad and Tinnevelley and on the south and west by the Arabian Sea. The Eastern boundary is for a very large part, the watershed of the Western Ghats. It has a total area of 14,897 square miles. Politically it comprises (1) the district of Malabar (excluding the islands of the Arbian Sea) with an area of 5792 square miles, (2)

the native state of Cochin with an area of 1480 square miles and (3) the native state of Travancore with an area of 7625 square miles.



Population map of Kerala.
1 dot = 2500 persons.

According to the Census of 1931, Kerala has a population of 9,834,933, with an average density of 660.9 persons per square mile distributed rather unevenly in the three political units. The distribution is as shown below:—

| *Region.* | *No. of persons.* | *Area in square miles.* | *Density per square mile.* |
|---|---|---|---|
| Malabar | 3,533,944 | 5,792 | 610 |
| Cochin | 1,205,016 | 1,480 | 814 |
| Travancore | 5,095,973 | 7,625 | 668 |
| Total *Kerala* | 9,834,933 | 14,897 | 660.9 |

The following tables give the density of population of some of the other provinces of India. The densities of population of some of the most densely peopled parts of the world are also appended here for purposes of comparison.

| Region | Density of population per sq. mile. | Region. | Area in square miles. | Density of population per sq. mile. |
|---|---|---|---|---|
| Madras | 329 | [1]Howrah | 510 | 2105 |
| Bengal | 646 | Dacca | 2723 | 1265 |
| United Provinces | 456 | Tippera | 2560 | 1197 |
| Punjab | 236 | Noakhali | 1515 | 1124 |
| North-West Frontier Province | 179 | [1]Delhi | 593 | 1110 |
| Bombay | 176 | Muzaffurpur | 3036 | 969 |
| Central Provinces | 155 | Dharbhanga | 3348 | 946 |
| Assam | 148 | Hoogli | 1188 | 938 |
| Burma | 63 | Benares | 1093 | 930 |
| Baroda | 299 | Saran | 2683 | 927 |
| Hyderabad | 175 | Patna | 2068 | 893 |
| Mysore | 223 | Bakarganj | 3490 | 834 |
| Belgium | 686 | Mymensingh | 6238 | 823 |
| Germany | 345 | | | |
| Japan | 433 | (considered to be one of the most densely populated regions of the world !) | | |
| England and Wales | 685 | (the most populous parts of Britain) | | |

[1]Howrah and Delhi are actually urban areas and should really be excluded from this list. The density of population in Cochin is higher than that of every other province of India except Delhi. Even the most densely

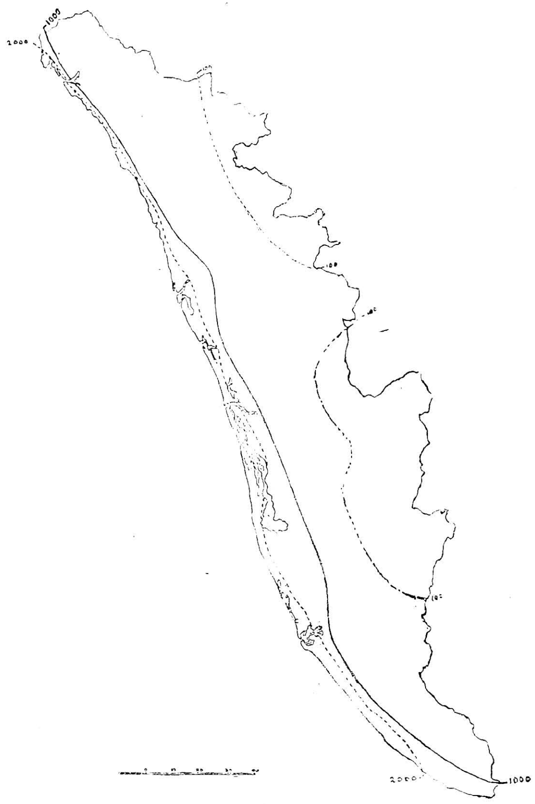
It is therefore clear that the density of population in Kerala is very great and it is one of the most densely peopled parts of the world. It must also be remembered that Kerala is an agricultural region with little industrial development so that direct comparisons with the densely peopled industrial parts of Europe are misleading.

Kerala[2] like any other part of India is far from being industrialised and the standards of living are not lower than in the adjoining provinces. Hence this high density could only be explained by the exceptional productivity of this region. The population is distributed very unevenly. On looking at the isopleth map, it is seen that a large part of the coastal lowlands has the very highest density, (more than 2000/sq. mile) and the highlands have the lowest density (less than 100/sq. mile). Every part of the lowland has a density more than 1000/sq. mile ; the foot-hill zone has a density ranging between 100 to 1000.[3] The tabular statement below illustrates this difference very clearly.

peopled parts of Europe stand below Cochin. These comparisons are not so true because of the small size of Cochin and the tables on the right are given to facilitate comparisons with areas similar to Cochin. It is clear that there are few parts of India with greater densities.

2. On the facts of Physical and Human Geography, it would be advisable to divide Kerala into three natural regions, (1) the coastal lowlands where the elevation in general is less than 250 feet formed of recent sediments and where the predominant crops are coconut and rice ; (2) the foot-hill zone composed essentially of laterites, Warkkalay formations, etc., the elevation of which ranges from 250 feet to 1000 feet and where the predominant crops are dry crops like tapioca, yam, pepper, etc., with a certain amount of rice and coconut cultivation ; and (3) the highlands where the elevation is always in excess of 1000 feet, the area being either under forest or plantation crops like rubber, tea, or cardamom. See Dudley Stamp, *Asia, a Regional and Economic Geography*, p. 314-316 where a similar tripartite division is suggested. It is unfortunate that Dr. Stamp does not determine the boundaries of these natural regions definitely.

3. The choice of these figures of 100, 1000, and 2000 would require some explanation. The highland region, the region mainly of the plantation crops has a density less than 100/ sq. mile. The coastal lowlands—the area predominantly of coconut and mostly of rice has a density of more than 1000 square mile. The foot-hill zone, the area mostly of tapioca and pepper—the dry crop region—has a density varying from 100 to 1000 per square mile. The land utilisation explains these figures. These isopleths fairly well correspond with the contour lines, lowland less than 250 feet, highland greater than 1000 feet.

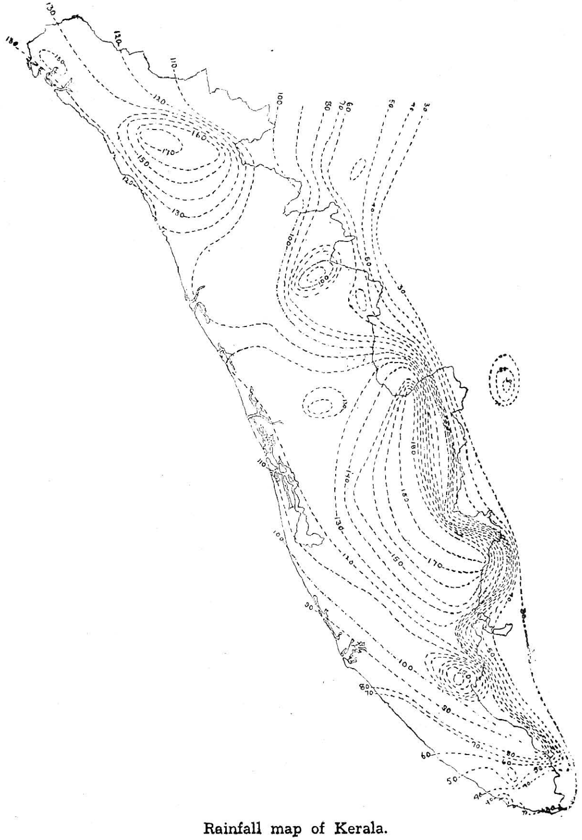



Isopleth map of Kerala.

| Name of Taluk. | Density in lowlands. | Density in foot-hill zone. | Density in highlands. | Remarks. |
|---|---|---|---|---|
| Agastheeswaram | 1374 | 619 | — | lies entirely outside the highlands. |
| Thovala | — | 612 | 147 | lies entirely outside the lowlands. |
| Kalkulam | 1998 | 908 | 53 | |
| Vilavancode | 2112 | 1320 | 82 | |
| Neyattinkarai | 2184 | 1401 | 124 | |
| Trivandrum | 1526 | | | lies entirely in the lowlands. |
| Quilon | 1497 | | | Do. |
| Karunagappally | 2111 | | | Do. |
| Karthikappally | 1860 | | | Do. |
| Ambalapuzha | 1238 | | | Do. |
| Shertallai | 1746 | | | Do. |
| Parur | 1540 | | | Do. |
| Chirayinkil | 2189 | 757 | | lies outside the highlands. |
| Nedumangad | — | 722 | 98 | lies outside the lowlands. |
| Pathanapuram | — | 628 | 124 | Do. |
| Pathanamthittai | — | 75 | 1 | Do. |
| Cranganur | 2429 | — | — | lies entirely in lowlands. |
| Cochin-kanayannur | 2210 | — | — | Do. |
| Trichur | 1240 | 800 | 80 | approximately |
| Ponnani | 1471 | — | — | lies entirely in lowlands. |
| Wynad | — | — | 112 | lies entirely in highlands |

In an agricultural region like Kerala, the factors that govern the density of population are chiefly those concerned with the cultivation of the crops and the distribution of the produce. Rainfall, soil, means of communication, and the kind of crops cultivated are the most important of these factors. It is not possible to isolate any one of them from the rest and study its influence on density, independently of the others. All of them operate jointly, and it is their combined effect that influences the distribution of population. *Rainfall* is one of the prime factors in cultivation. The varieties of crops cultivated and their yield per acre, depend to a very large extent on the volume and distribution of rain. The success of cultivation in Kerala depends to a large extent on the rainfall and its even distribution during the agricultural seasons. The region has seldom witnessed the complete cessation of rain in any season. The total failure of crops creating famine conditions has therefore been a very rare occurrence. Owing to the late arrival of the monsoons, or the unequal distribution of rainfall

during the periods of cultivation, crops in some parts of the country may sometimes meet with a partial failure, but the damage caused is generally not so great or widespread as is often the case



Rainfall map of Kerala.

elsewhere in India. Damage from floods due to excess of rainfall is perhaps more common and during the last census decade there was a very heavy damage by the floods of 1924 and a smaller one in 1929.

In Kerala, the regions with a deficiency of rainfall are (1) the three southern taluks of Thovala, Agastheeswaram and Kalkulam, (2) the taluk of Shencottah and, (3) the Chittur taluk of Cochin. In the three southern taluks, the deficiency is made up by artificial irrigation from the Kothayar project, and in Shencottah by tank irrigation. In the Chittur taluk of Cochin nearly 20,000 acres are irrigated by canals from the Government anicuts. In most other parts, the only defect in the rainfall is its uneven distribution and as far as Kerala is concerned, rainfall seems to have very little influence on density e.g., Ambalapuzha with a rainfall of 105″ has a density of 1238/sq. mile while Karunagappally with a rainfall of 89″ has a density of 2161/sq. mile, and both these taluks lie entirely within the lowlands. Such variations exist even more markedly in the highlands and foot-hills. The highest densities are found in those regions where the rainfall is about 90″ per annum.

*Soil.*—The nature of the soil and its fertility have a direct bearing on the kind of crops cultivated. In the lowland division, the soils are essentially recent sediments and they are best suited to the cultivation of the coconut palm and rice. The foot-hill zone is composed mostly of laterites and they are best suited for the growth of dry crops like tapioca. The highland zone is composed of crystalline gneisses where lateritisation has not taken place. This soil is more suited to plantation crops like tea, cardamoms, rubber etc. Rice is the chief food crop and it is found that the density of population varies directly as the extent of rice cultivation. The variation in density however is not quite proportional to the variation in area under rice. This is due to the presence of other crops like coconut in the lowlands, tapioca in the foot-hill zone and also to other extenuating circumstances like the availability of a rich food supply in the form of fish in the coastal lowlands. Nevertheless, it is clear that where land is more suitable for rice cultivation, there the density is higher.

*Means of Communication* are essential to the development of cultivation. It is those regions which are easily accessible and which contain the cheapest forms of transport that attract people first for settlement. The lowland division is the best in these respects because it is the most accessible portion of the country and is well served by water communications which provide the cheapest form of transport. It is here that one notices the highest density. The highlands are the least accessible; and one notices the least density in this region.

*Crops and their Cultivation.* A close connection seems to exist between the density, the proportion of the cultivable and the cultivated lands and the kind of crops cultivated.

[4]*Density of Population and Proportion of Cultivated area to Total area*

| Division. | Proportion of cultivated to total area. | Density of population of total area. |
|---|---|---|
| Lowlands | 79·7% | 1743 |
| Foot-hills | 68·5% | 892 |
| Highlands | 13·9% | 82 |

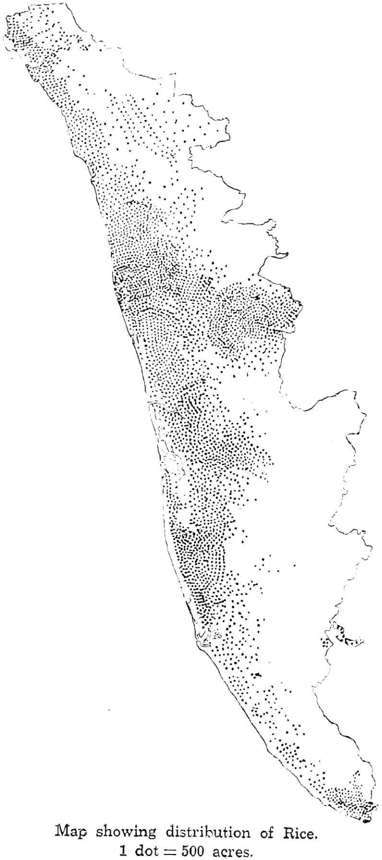
*Density of Population and Proportion of Cultivated to Cultivable area.*

| Region | Proportion of cutivated to cultivable area. | Density of Population of cultivable area. |
|---|---|---|
| *Lowlands of Travancore | 91·2% | 1994 |
| Foot-hills of Travancore | 79·6% | 1037 |
| Highlands of Travancore | 40·1% | 237 |
| | Approximately. | Approximately. |
| Lowlands of Kerala | 90% | 2000 |
| Foot-hills of Kerala | 80% | 1000 |
| Highlands of Kerala | 40% | 200 |

Certain things have however to be well borne in mind. Rice which is the staple food of the people is cultivated most extensively in the lowlands. Coconut which is the chief money crop of the ordinary cultivators and the produce of which they exchange for rice to make up the deficiency in local production is also cultivated in this region more extensively than elsewhere. The chief cottage industry of coir yarn is almost exclusively confined to the lowlands. Fish which is an important supplement to rice in the dietary of the majority of the population is more abundant in this tract than elsewhere because of its proximity to both the sea and

4. These statistics refer to Travancore ; it is unfortunate that no accurate statistics are available for the other parts of Kerala ; but it can be assumed that the actual conditions in both Cochin and Malabar are not far different from those in Travancore.

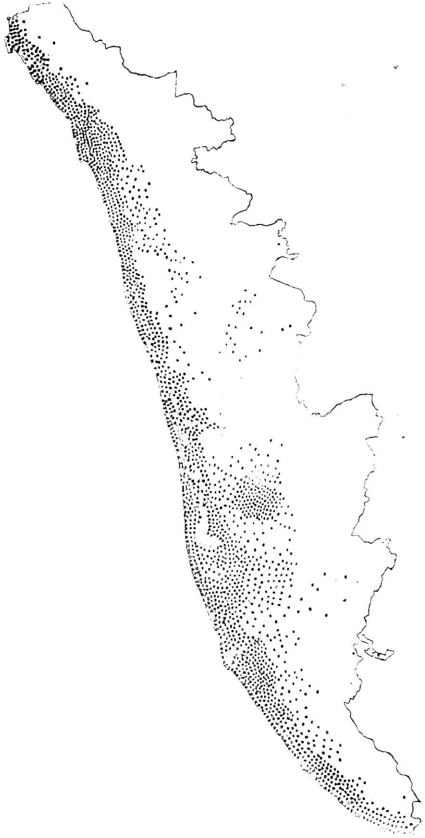
the large expanse of the backwaters and the lagoons. Owing to these circumstances, the population which a square mile of land in this division can support is considerably more than the propor-



Map showing distribution of Rice.
1 dot = 500 acres.

tion of cultivated area either to the total area, or to the cultivable area would seem to warrant. While the proportion of cultivated

area to the total area or the cultivable area in the lowlands is only about 10% more than that in the foot-hill zone, the density of both the total area and the cultivable area in the former, is nearly twice



Map showing distribution of Cocoanut.
1 dot = 500 acres.

as much as the latter. Besides rice, tapioca is also a staple food, especially of the poorer classes. It supplements, but does not

supplant rice. Tapioca is most extensively cultivated in the foot-hill zone. This tract produces less rice and coconut, but more pepper (another money crop, though not so extensively cultivated as the coconut) than the lowlands, but distinctly more of rice and coconut than the highlands. Hence the density of the foot-hill zone is less than in the lowlands but higher than in the highlands. The highlands contain the least proportion of the above mentioned food and money crops ;[5] but the major portion of rubber and practically all the tea and cardamoms are produced here. These crops (particularly tea and rubber) are mostly in the hands of European Planters and consequently, though the opening of the tea and rubber estates has increased the proportion of cultivated land to the total or the cultivable area in the highlands, it has not correspondingly increased the number of persons supported by land.

A correct idea of the number of persons a particular tract can support and is now supporting can only be had by a study of the densities on the cultivable and cultivated lands. In the lowlands, more than 90% of the cultivable lands is being cultivated, while in the foot-hill zone about 80% and in the highlands only about 40% of the lands that could be cultivated are brought under cultivation.

*Density of population per square mile of cultivated land.*

| Region. | Travancore. | Cochin. | Malabar. | Average for Kerala. |
|---|---|---|---|---|
| Lowlands | 2186 | 2733 | 2000 (nearly) | more than 2100 |
| Foot-hills | 1303 | 1126 | about 1000 | more than 1100 |
| Highlands | 591 | 365 | about 400 | about 450 |

Owing to the difference in the capacity of the soils, in the accessibility of the regions and in other factors, the number of persons that are able to live on the produce of the same unit of land in the three divisions naturally varies. The figures show that the lowland has reached the highest point—perhaps even exceeded the saturation point—there seems to be some scope for the absorption

5. In Malabar (excepting Wynaad) and Cochin, the highlands are utilised for the cultivation of 'modan' rice, a phenomenon which is almost entirely absent in Travancore. Plantation industry is a peculiar development in the highlands of Travancore.

of the population in the foot-hill zone where about 20% of the cultivable land is still available for cultivation. There is decidedly much better scope for the accommodation of a larger population in the highland where the density on the cultivated land is low (less than 600/sq. mile) and where 60% of the land available for cultivation is still uncultivated. This is however the most inaccessible part of the country and the absence of proper means of communication seriously obstructs the rapid movement of population to this region.

| Division[6] | Proportion of food crops (paddy & tapioca) and money crops (coconut & pepper) to gross cultivated area. | Density of Population of cultivated area. |
|---|---|---|
| Lowland | 89·3% | 2186 |
| Foot-hills | 85·1% | 1303 |
| Highland | 43·6% | 591 |

It is found that the proportion of the area under food and money crops to the gross cultivated area is only slightly higher in the lowland division than in the foot-hill zone, but the density of population on the cultivated area in the former is nearly twice as much as that of the latter. Between the foot-hill zone and the highlands, the variations in density on the other hand, correspond almost exactly with the variation in the proportion of the area under food and money crops, (excluding tea and rubber) to gross cultivated area. "But for the small areas occupied by the lagoons, the coastal lowlands comprise extensive coconut gardens, thickly dotted with houses. The various industries in connection with the coconut palm, the rich fisheries of the sea and the lagoons, the fertile rice fields on the margin of the latter, and the multifarious occupations of a commercial and maritime tract, can afford to maintain in a fair degree of comfort a population so densely packed that it must inevitably starve in less favoured regions."[7]

6. The above statistics refer only to Travancore and it is unfortunate that no such accurate records are available either for Cochin or Malabar. Nevertheless it is perhaps true to assume that more or less similar conditions prevail in both Cochin and Malabar so that conditions in Travancore can be taken as typical of Kerala. Rubber and tea have been excluded from the above statistics to eliminate their disturbing factor in the calculation of the density.

7. Vide Census reports of Cochin 1931, Parts I and II, page 11.

Hence the conclusion that the number of persons a square mile of cultivated land in any tract can support varies directly as the proportion which the land cultivated with ordinary food and money crops bears to the gross cultivated area, provided there are no disturbing factors such as the existence of industries, the availability of other sources of food supply like fish and the cultivation of plantation crops like tea and rubber which benefit the foreign investors more than the indigenous population.

According to recent estimates Germany cultivates 2 acres of land for each man supported by agriculture, France 2.3 acres, Italy 2.4 acres, and Belgium 1.7 acres. Average 2.2 acres per head of population supported by agriculture which is not far from the figure of 2.5 acres per capita estimated as the maximum possibility for the world as a whole.[8] It is found that every acre of cultivated land in Kerala has to support 2.422 persons or 0.4 acres of cultivated land is available for each person—a figure which is extremely low. Calculating the number of persons supported by agriculture we find the following:—

Number of persons supported by agriculture in

| | | | |
|---|---|---|---|
| Travancore | .. | 2,072,642 | |
| Cochin | .. | 602,508 | (approximately) |
| Malabar | .. | 1,776,972 | (approximately) |
| Kerala | .. | 4,452,122 | (approximately) |

Hence the per capita acreage is 0.91 (approximately).

In Kerala the total cultivated land is only 4,060,778 acres and the number of persons supported by agriculture is 4,452,122 approximately. Each of them therefore has 0.91 acres of cultivated land. Although it may be argued that the nature of the land and tillage are different and that Kerala has more intensive cultivation than most parts of Europe, yet in point of acreage Kerala is much worse off than the European Countries. It is slightly better off than Japan in regard to the average area of cultivated land per head of the total or agricultural population.[9] The out-turn of crops per acre in Japan is more than four times that of Kerala; and

8. Edward M. East *Mankind at the Cross-roads*, page 70.

9. In Japan in 1920, the area cultivated was only 0.32 acres per head of the population and 0.45 acres per person supported by agriculture. During the last 15 years the population of Japan has been increasing at an average rate of 640,000 per annum (an estimate of Col. Etherton, Vide *Japan, the Mistress of the Pacific*) so that the present conditions are much worse than those in 1920.

Japan is much more industrialised than Kerala. Naturally therefore the standards of living in Kerala are lower than both in Europe and Japan. Further, the cultivated area in Kerala has not increased pari passu with the growth of population. There has been an increase in the yield of crops, which together with the increase in area, has not kept pace with the increase in the population.

The development of local agriculture by extending the area under cultivation and by improving the methods of farming will increase the means of subsistence and enable the country to maintain a larger population at a better standard of life. Out of a total cultivable area of 6,163,123 acres, 2,102,345 acres including current fallows and culturable wastes still remain uncultivated.[10] Much of this land may be so poor in quality or so inaccessibly situated that it may not respond so liberally as the land already brought under cultivation. The defects could and will in course of time be removed by developing the means of communication and by improving the methods of cultivation. Such lands will certainly support a density approximately equal to the present average density of Kerala, i.e., about 660 persons per square mile. In other words an additional population of slightly more than 2 millions could be supported.

Kerala in 1921 had a population of 8,084,013 so that the average rate of growth during the last census decade was 21.6% i.e., 2.16% per annum. It is clear that if the rate of growth has remained the same as at the last census decade, the population since the last census has increased by another 15%, or nearly 1.5 millions. The population therefore is fast approaching the maximum figure based upon the present food resources and at this rate of growth the saturation point will be reached by 1941.

The only other way of increasing the area under cultivation is to encroach upon the reserved forests which form nearly 4500

10.

| | Cultivated area. | Current fallows and culturable waste. |
|---|---|---|
| Travancore | 2,116,888 | 842,000 |
| Cochin | 456,794 | 62,369 |
| Malabar | 1,487,096 | 1,197,976 |
| Kerala | 4,060,778 | 2,102,345 |

square miles [11] i.e., slightly less than one third the total area. Much of these are hill slopes of rugged rocks while a great portion is only mere grassland where nothing else perhaps will thrive. "So far as my knowledge goes, I do not think that there remains any appreciable extent fit to be yet thrown open for this purpose" (agriculture). [12] It should however be remembered that the maintenance of forest areas is essential in the interests of rainfall and consequently of agriculture; the destruction and the consequent denudation of the timber-clad hill slopes would otherwise give rise to floods, avalanches, silting up of the rivers and streams and even perhaps, the disappearance of several sources of water supply.

*Yield.*—The average yield of an acre of land in Kerala is small compared with what is being obtained in the Western Countries, and Japan. [13] By the adoption of scientific methods of cultivation, the yield can certainly be increased. The Western methods cannot be transplanted with ease due to the small holdings in Kerala. About 10% of the holdings are less than 50 cents, 38% less than 1 acre, 87% less than 5 acres and 96% less than 10 acres. In any country the size of an economic holding varies with the standards of living and the type of crops cultivated, but for a family of five in Kerala, the estimated figure is about 8 to 10 acres. Hence nearly 90% of the holdings of Kerala are uneconomic. In addition, the agriculturist is ailing from chronic indebtedness, which, in spite of the multifarious attempts by the governments has not yet been successfully cured. The future prospects, if the region continues to be agricultural, are far from being rosy.

*Distribution of Population.*—The distribution of population in Kerala is different from the distribution on the East Coast.[14] "An absence of villages as they are to be found in the East of the Peninsula is a characteristic of Malabar generally including the

11.

| Region. | Forests and rugged slopes. |
|---|---|
| Malabar | 1500 sq. miles approximately |
| Cochin | 500 sq. miles approximately |
| Travancore | 2500 sq. miles approximately |
| | Total .. 4500 sq. miles. |

12. Statement made by the Conservator of Forests of Travancore and quoted by the Census Commissioner in his report in page 45, 1931, Travancore Census Report, Part I. This may not be applicable to some parts of North Malabar.

13. Paddy 3000 lbs. in Italy, 5000 lbs. in Spain, 2500 lbs. in Japan, and only 1250 lbs. in Kerala.

14. Slater. *Economic Studies of South Indian Villages,* Page 123.

states of Travancore and Cochin, and the Malabar District of the Madras Presidency. The Malayalees are averse to having their houses congregated together". The taluks of Thovala, Agastheeswaram, Shencottah, Chittur and Palghat are transition regions between the East and the West coasts[15] with a considerable portion of the population being Tamil-speaking. Chittur and Palghat command the Palghat gap, Thovala and Agastheeswaram in the South command the Aramboly gap, and Shencottah is on the eastern sides of the Ghats; and it is not surprising therefore that they have in them the features of the East coast. Excepting in these transition regions, there is no village in Kerala in the strict sense of the word which connotes a cluster of houses huddled together in a small area possessing a common wall and a common tank, with wide stretches of arable land around them having no habitation. "Every house without exception has a compound big or small surrounding it in which there are coconut palms, arecanut palms, mango trees, jack fruit trees, plantains etc. and sometimes pepper. During the hot months vegetables are watered and grown in the compound itself". The rural parts of Kerala resemble more or less the country parts of Bengal. Rural Bengal has been described in the following manner.[16] "Each family lives within its own holding, *digging a moat* round an ample piece of land and planting a garden of fruit trees to enclose the homestead. The homestead itself is a collection of mat and thatch huts on high mud plinths, all built on well raised ground surrounding a court-yard. Near by, within the moat, is a muddy tank. The homestead is usually entirely concealed by trees, so that at first sight, it appears as if all the cultivated land is a clearing in the forests. The opens in which crops are grown are always kept delightfully green by the unfailing moisture of rain and flood and the eye is never tired by the weary miles of dust which is the common habit of an upcountry landscape." The only alteration to this description necessary to make it applicable to Kerala is to substitute the words "making an earthern wall" for the words "digging a moat". In the coastal lowlands, many villages are as populous as the towns; the village of Elankunnapuzha in the Cochin taluk with an area of 3.8 square miles has no less than 4090 persons to the square mile; other villages of about the same or larger area follow close behind with densities ranging between 3500 and 4000 persons per square mile![17] The whole region along the coast is from one end

15. Slater. *Economic Studies of South Indian Villages,* page 131.
16. Census Reports of Bengal, 1921.
17. Census Reports for Cochin 1931, Parts I and II, page 11.

to the other like a garden city where one can hardly walk a furlong without seeing some houses. "The coast tracts are so densely populated that it is difficult to say where one of the municipal towns begins and where another ends. From end to end of the District on the lowlying lands near the sea, there is an unbroken belt of coconut palms and orchards and the description which Shaik Ibn Batuta gave of the country in the 14th century A. D. is equally applicable to it now. 'We next came into the country of Malabar ...... The whole of the way by land lies under the shade of the trees. And in all this space of two months journey, there is not a span free from cultivation. For every body has here a garden and his house is placed in the middle of it; and round the whole of this, there is a fence of wood (mud also) to which the ground of each inhabitant comes.' "[18]

Nearly 2/3 of the population of Travancore live in places having the highest densities, 25.1% of the total area containing 62.1% of the population of the state live in places where the density is more than 1000 per square mile and 46.5% of the area which contains 5.7% of the population has a density less than 300/sq. mile. In Cochin more than 1/3 the total population is concentrated in less than 1/8 the total area. In Cochin and Malabar about 65% of the population live in places where the density is more than 1000/sq. mile. It may therefore be stated as a rough approximation that nearly 2/3 the total population live in places where the density is more than 1000/sq. mile.

In Kerala the urban population is only 10% of the total population, but more than 3/4 the urban population is concentrated in towns of 20,000 and over. The villages of Kerala are different from those elsewhere with little or no nodality and they contrast themselves markedly with the villages of the Tamil Nad. Nevertheless the towns in Kerala are genuine urban agglomerations. Bridge-heads or crossing points on great rivers, important gaps or passes must always hold a primary position in the communication system of a country and one naturally finds such places among the more important urban collections. Rajamundry commands the Godaveri crossing, Bezwada on the Kistna, Trichinopoly on the Cauveri, Nellore on the Pennar, Chingleput on the Palar, Villipuram on the Pennaiyar, Tinnevelly on the Tambraparni, Bhavani at the Cauveri—Bhavani junction. In Kerala the towns might be said to have arisen on the more important crossings of the lagoons

18. Logan. *Malabar*, Vol. I, page 87.

and backwaters. e.g. Tellicherry and Dharmapattanam, Mahe, Quilon and Edava, Chettwa, Cochin, Tangasserry and Anjengo; Kayangulam, Alleppey etc.

*Growth of Population.*—According to the Census of 1921 and that of 1931 the population of Kerala was as follows:—

| | 1921 | 1931 | Growth | Percentage of growth |
|---|---|---|---|---|
| Malabar | 3,098,871 | 3,533,944 | 435,073 | 14.4 |
| Cochin | 979,080 | 1,205,016 | 225,936 | 23.1 |
| Travancore | 4,006,062 | 5,045,973 | 1,089,911 | 27.2 |
| Kerala | 8,084,013 | 9,834,933 | 1,750,920 | 21.6 |

There is therefore a remarkable growth of population in Kerala during the last Census decade. For purposes of comparison, the following figures are given.

| Region | Percentage growth during 1921-1931. |
|---|---|
| India | 10.6 |
| Madras | 10.4 |
| Bombay | 13.4 |
| Bengal | 7.3 |
| Hyderabad | 15.8 |
| Mysore | 9.7 |
| Baroda | 14.9 |
| Jammu & Kashmir | 9.8 |
| Gwalior | 10.3 |

The rate of growth however is far from being uniform. Malabar has only 14% while Travancore has nearly double this increase. A heavier increase in the population can be expected on the West Coast on considerations of climate and fertility, but South Kanara does not reach the Malabar standard (11% increase). In fact the increase of population shows a dimunition on the West Coast from south to north. It is interesting to note that North Kanara in the Bombay Presidency continues this dimunition by registering an increase of only 4%.

The physical and economic conditions of Kerala are more favourable to the growth of population than those obtaining in other parts of India. Except in portions of a few large towns like Cochin, there is no overcrowding of houses; in rural areas and in many parts of towns the houses are scattered.[19] The cleanliness

19. See Slater *Economic Studies of South Indian Villages.* page 131.

of the Malayalees is proverbial. "Both men and women are extremely neat and scrupulously particular as to their cleanliness and personal appearance".[20] Even the poorest have a daily bath, keep themselves, their houses and their premises scrupulously clean. Living under such conditions, it is not surprising that there is no serious or widespread outbreak of epidemics as in other parts of India. The soil here is fertile and nature bountiful. Rain is generally plentiful and though there may be some shortage and irregular distribution at times, it never keeps off entirely. The country gets the benefit of both the monsoons and cultivation seldom meets with total failure. The economic conditions of the average man of Kerala are therefore much better than those of the average Indian.[21] Such conditions naturally favour a high birth-rate and a low death-rate. Kerala has an average birth-rate of 40 per 1000 and a death-rate of 22 per 1000. In other parts of India, the birth-rate is not higher, but the death-rate is as much as 35 per 1000 or even more!

Looking at the growth of population, one notices, certain marked features of contrast between the transition regions of Thovala, Agastheeswaram, Shencottah, Chittur, Palghat, Wynaad etc., and the other parts of Kerala. These transition areas are registering an average increase of 12% only. Thovala, Agastheeswaram and Shencottah are very similar to the adjoining British territories, they originally formed part of the Tamil country;—even to-day a large portion of the population is Tamil—speaking —they have an average rainfall almost equal to that of the Tinnevelly district. The type of settlement is the typical congested East Coast type in several parts. In

20. Vide Logan, *Malabar*, Vol. I. Page 136 and also the foot-note by the Editor in page 159 of the *Economic Studies of South Indian Villages*.

21. Vide Slater, *Dravidian Element in Indian Culture*, page 139. "The exceptional bounty of nature on the Malabar coast makes a very short average day's work sufficient to maintain the population according to the different standards of comfort of the different classes. It also makes possible an extreme degree of social inequality, and actually perhaps 50 per cent of the population do no productive work at all and the 10 per cent who maintain the whole by their labour get only the barest minimum of subsistence and by way of thanks are treated as untouchables. On the whole they are said to be more contented than the labouring class of any other country, because it has not occurred to them that any variation in their condition is possible. In the Carnatic the dependence of the population is more exclusively upon rice and other cereals and the necessity for labour greater; and it is of course greater still on the tableland of the Deccan."

these circumstances is it not natural for the growth of population to follow the trend in British India which is much less than that of Travancore ? The half detatched and scattered taluk of Chittur in Cochin State does not conform to the standards of the other taluks of Cochin. The scanty rainfall, the extensive forest area and the scourge of malaria so characteristic of Chittur have turned it into an unhealthy and uncongenial tract, where the density of population and the rate of increase in population are both low. The unfavourable conditions are more marked in the north-east block of the taluk—in the Tamil-Malayalam cultural border-zone lying detatched from the rest of the state. Palghat like Chittur has much in common with Coimbatore, and Wynaad is a thinly populated, highly malarial transition region between the western littoral and the Nilgiris plateau. Palghat and Wynaad are the least representative areas of the district of Malabar and they have returned the lowest growth of population.

Equally well, other differences in the rate of growth are remarkable between Travancore on the one hand and Cochin and Malabar on the other. In Travancore in general in the last Census decade, it is found that the maximum growth of population was in the regions where the density per square mile of cultivated area was lowest while the minimum growth was in the regions where the density per square mile of cultivated area was the greatest.[22] But even in the densest parts of Travancore, the growth has been slightly more than 20%. The phenomenal growth is noticed in the highlands due partly to the opening up of the rubber and tea plantations. Agriculture is the sole occupation of the people in these regions, and the facilities which they contain for the extension of cultivation have attracted large numbers of immigrants from all parts of Travancore and elsewhere.[23] In Cochin and Malabar there are no plantation industries similar to those in Travancore. The highlands are being utilised for the cultivation of rice. This difference in land-utilisation explains the phenomenal growth of population in the highlands of Travancore, lack of plantation industries therefore accounting for the smaller rate of growth of population in the highlands of Cochin and Malabar. During the last Census decade the

22. Except Thovala, Agastheeswaram and Shencottah. The lazy nature of the Malayalee—contrast the East Coast man.

23. Unfortunately correct statistics showing the cultivated area in different taluks in 1921 are not available.

rate of growth of population in Cochin in areas other than the forested highlands was fairly constant—about 25%—due to the following causes:—

1. The opening up of the Cochin harbour and the growth of Cochin as a commercial Centre. The numerous rice and oil mills of Mattancheri and Ernakulam are indications of industrial progress.

2. The tremendous improvements in irrigation facilities in the Mukundapuram taluk.

3. Presence of a large spinning and weaving mill and several tile factories in Trichur.

There are no similar commercial and industrial undertakings in Malabar which account for the lower rate of growth of population in that area.

# The Rivers of the Palar Basin

By

B. M. Thirunaranan, B.A. Hons., (London),
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The rivers of the Peninsula which flow into the Bay of Bengal may be divided into three groups. First, there are the small streams which have their sources mostly below the Eastern Ghats, and end in lagoons along the coast which, sometimes, have no open connection with the sea. The large rivers which rise near the crest of the Western Ghats form another group; they drain large areas of the plateau, descend its eastern edge along gorges, and have large deltas at their mouths. The third group consists of rivers of intermediate size, which have their sources on the plateau, but drain only small areas of its surface; these too descend to the coastal lowland by means of gorges cut in the plateau edge, but do not have deltaic mouths. The Palar belongs to the last group.

This river rises in the hills to the southwest of Chintamani town in the Kolar District of Mysore State, and reaches the sea, after flowing more than two hundred miles, at a place about forty miles south of Madras. The valley of the river has been cut, from its source up to a point a few miles east of Arcot town, in the highly crushed and folded crystalline rocks of the peninsula, whose influence on the development of the drainage pattern is well-marked in places. The lower portion of the river's course, east of Arcot, lies along a narrow belt of recent alluvium of its own deposition, situated in a depression cut into the older sedimentary formations along the coast. Broadly speaking, the river has been cutting down its course above Arcot, and depositing material lower down.

The course of the Palar may be divided into six sections, based on the geological and physiographic differences between them. Its course on the plateau, from the source till it enters the gorge by which it descends the plateau edge, forms the first section; the gorge is the next, and it comprises that part of the course below Thumasi and above Thimmampeta, near Vaniyambadi. The third section, between Vaniyambadi and Mailpatti, consists of a progressively narrowing valley. Below Mailpatti, the river falls into three more sections; (a) from Mailpatti to

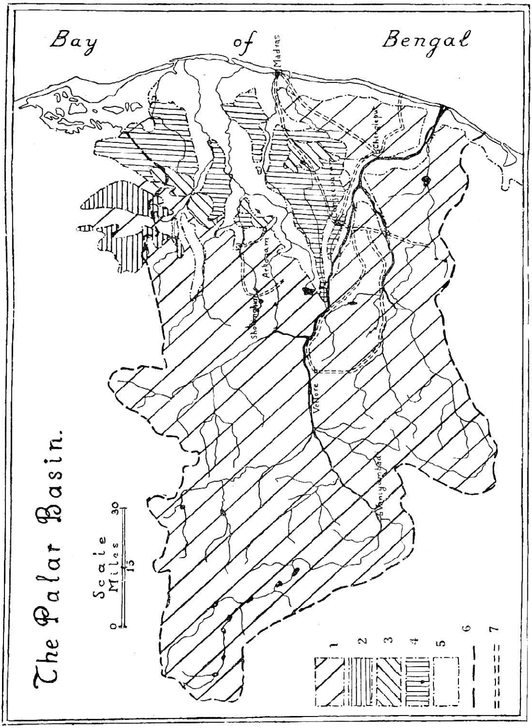


Fig. I. *The Palar Basin.*

1 = Peninsular gneiss ; 2 = Cuddapahs ; 3 = Upper Gondwanas (Jurassic) ; 4 = Older alluvium and laterite ; 5 = Recent deposits ; 6 = Limit of river basin ; 7 = Regular bus-routes.

Arcot, (b) from Arcot to the confluence with the Cheyyar, and (c) from the Cheyyar confluence to the sea.

The Palar and its tributaries on the plateau occupy broad and shallow valleys separated by rolling uplands and low rounded divides seldom more than 250 feet above the valley floor, with a few prominent scattered hillocks which rise abruptly above the general level of the country. This part of the Palar basin is an elevated peneplain, probably base-levelled more than once. The low gradient of the rivers and the shape of the valleys have aided the construction of many tanks for irrigation. These tanks are very often strung in series along the valleys, the outflow of

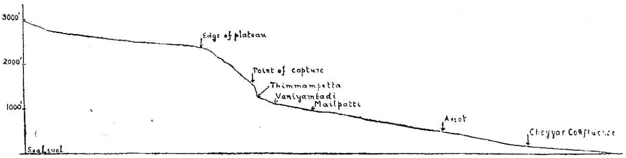


Fig. II. *Longitudinal Profile of the Palar.*

Horizontal scale 1″ = 1 million ; vertical scale 1″ = 1000 feet. The contour values were obtained from the one inch maps. The exaggerated vertical scale helps to show clearly the different sections distinguished in the paper.

each contributing to the supply of those lower down. During spells of very heavy and persistent rainfall, as is sometimes associated with the passage of cyclones from the Bay of Bengal, the small tanks in the upper portions of the valleys breach, and are followed by the breaching of all the others lower down in the valleys, thus suddenly releasing enormous quantities of water into the river. Such floods, which are most likely in the months of October, November and December, have, in the past, caused extensive damage to crops and property, and sometimes the loss of many lives.[1] Tank construction modifies the natural development of the river-profile in two ways; in the first place, it interrupts the flow and breaks up the profile by interposing numerous artificial obstacles; and during floods, the extraordinary increase in the volume of water causes phenomenal features of erosion and deposition in the affected portions of the river-valley. It is also contended especially by the inhabitants of the North Arcot

1. Stoney: *Flood in Palar*, 1903 (Proceedings of Institute of Civil Engineers, Volume 204).

district, that the ground-water level in their section of the Palar valley has sunk deeper than before as a result of the diminution of flow through the construction of more tanks in the plateau section of the river-basin.

The gorge of the Palar, between Thumasi and Thimmampeta represents the progressive dissection of the plateau edge. The straight valleys, their angular junctions, and the repetition of the two main valley-trends, south-west to

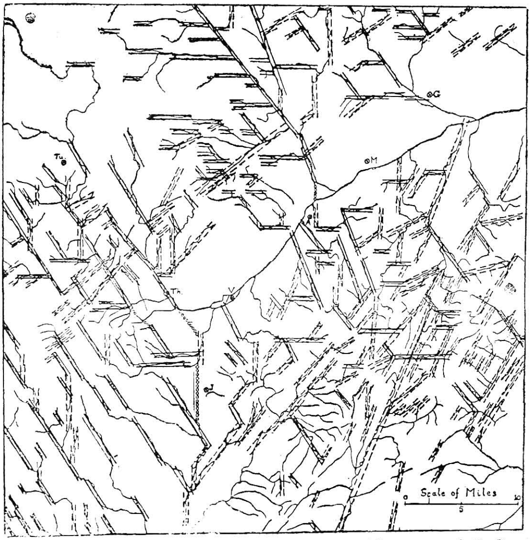


Fig. III. *Valley trends in the Palar basin, between Thumasi and Gudiyattam.* The streams were copied from the quarter inch map, and the valley lines emphasised by ruling parallel lines on either side of the streams. G = Gudiyattam ; M = Mailpatti ; A = Ambur ; V = Vaniyambadi ; J = Jalarpet ; Th = Thimmampetta ; Tu = Thumasi. The lines of small circles mark the abandoned river courses.

north-east and south-west to south-east, all show the strong control exerted by the structure on the drainage-pattern of this section. The gorge is V-shaped in the upper part of the river's course, and Y-shaped lower down. The V develops into a Y below Kangundi, where the valley floor is

about 2,000 feet above sea-level. The difference in shape between the upper and lower parts of the gorge is probably due to changes in the course of the river lower down, resulting in local rejuvenation of the lower part of the gorge, which has not yet communicated itself to the upper part, owing, perhaps, to structural resistance to erosion.

The gradient of the next section, between Thimmampeta and Mailpatti, is much less than that of the gorge, and the two are clearly separated by a distinct break in the river-profile where the Palar emerges from the gorge two miles west of Thimmam-

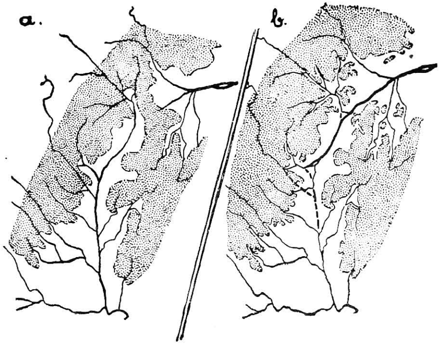


Fig. IV. *The Reversal of the Palar's Course.*

$a$ = The probable original drainage pattern ; $b$ = The present river systems. The valley sides over 1500 feet above sea-level have been stippled, to emphasise the relief, and also to bring out the fact that this valley was already naturally developed before the reversal of the course of the Palar occurred, and the change in direction of the main stream has been followed only by the lowering of the valley floor.

peta. The valley in which the Palar flows between Vaniyambadi and Mailpatti is widest at its upper end, south-west of Vaniyambadi, and narrowest at its lower end at Mailpatti. The hills at Mailpatti appear to block the valley, which is not only open but widens still more beyond Vaniyambadi. The river has quite recently cut its bed in this section below the general level of the valley floor, which can be very clearly distinguished near Vaniyambadi, and to some extent even as far as Ambur. The level of this former valley floor seems to have been over 1350 feet

above sea-level around Vaniyambadi, whereas the lowest point on the divide crossing the valley or gap south-west of that town is only 1320 feet (at Jalarpet). The elbows formed by the Palar

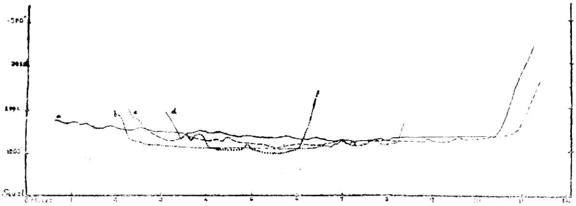

Fig. V. *Cross-sections of the Palar Valley between Jalarpet and Mailpatti.* $a$ = Section across the dry valley, passing through Jalarpet; $b$ = Section across valley 2 miles south-west of Ambur; $c$ = Section across valley 2 miles south-west of Vaniyambadi; $d$ = Section across valley 1 mile east of Mailpatti. These sections were aligned and drawn to show (1) how the valley becomes narrower as we go down the river, (2) that the gradient of the valley is only slight, and (3) that there is a remarkable accordance of heights between the old valley floor, surviving *in toto* at Jalarpet, and the relics of it which occur lower down.

and its tributary south-west of Vaniyambadi, the direction of the Malattar and the angle at which it joins the main stream at Ambur, are additional evidence of the Palar having formerly flowed in the opposite direction in this valley between Vaniyambadi and Mailpatti.

Its former course must have been south-westwards, as a tributary of the present South Pennar, and the divide between the Palar and South Pennar basins had then crossed this valley at Mailpatti, and not, as at present, at Jalarpet. Progressive headward erosion and consequent captures effected by that part of the Palar between Mailpatti and Gudiyattam, which was originally only a minor stream—the Kaundinya nadi being the main stream—has evolved the present drainage systems. The Vaniyambadi—Mailpatti section of the Palar valley is the dominant line of weakness in this region, judged by the size of the valley carved along it, and the course of the Palar as well as the trend of this valley change at both ends. The north-east to south-west and south-east to north-west valley trends become less evident to the north and east of Mailpatti, where an east-west trend prevails, even in the course of the Palar itself. South-west of Vaniyambadi, the main valley occupied by the Pambar runs north-south

for more than twentyfive miles. These features, considered together, suggest that this section of the Palar valley is characterised by structural differences at both ends, leading to greater resistance to erosion at the two ends than in the middle portion of the valley. (There are several dykes which outcrop southwest of Jalarpet, running north to south, i.e., obliquely across the direction of the valley.) When headward erosion at Mailpatti had cut across the divide and reached into the main valley, further progress along it would have been rapid, since it was along the main line of weakness in this area. The successive river-captures would have added to the flow of the reversed stream and thus increased its capacity for downward erosion at Mailpatti; and at the same time, the flow south-westward would have been correspondingly diminished, and the valley-deepening retarded, near Jalarpet.

Below Mailpatti the valley of the Palar widens gradually till it reaches the eastern limit of the hilly area at Visharam, about three miles west of Arcot. The area traversed by the Palar in this section is characterised by numerous scattered hills mostly less than 2000 feet in height; they are the surviving relics of the former eastern extension of the plateau and are structually part of it. The fact that the general elevation of these hills is less than that of the still intact plateau further west, and their isolated distribution show that the development of the relief of this area has passed the mature stage.

The shape of the sedimentary deposits below Arcot resembles that of a river-delta, and this resemblance is strengthened by the arrangement of the river-courses below this point. The river-valleys seem to have been first cut into the older alluvium, then filled with deposits of recent alluvium, and again cut into these newer deposits, which consist of clays and sands sometimes mixed with much coarse, gritty material, interbedded in layers varying from a few inches to many feet in thickness. They have obviously been laid down when the rivers in these valleys had a much larger volume of flow, with marked periodical variations, and thus able to bring down so much material, as well as to deposit it at levels so far above the present river-beds. The volume of flow of all these rivers has probably diminished owing to the drier climatic conditions which have set in since the last Ice Age, and also to the reduction of the area freely draining into the rivers consequent upon the spread of cultivation in these river-basins, and the impounding

of much of the surface drainage in tanks for irrigation purposes. The tanks not only thus withhold a part of the drainage from the streams which would have naturally reached them, but also, in several cases, draw water from the rivers by means of channels.

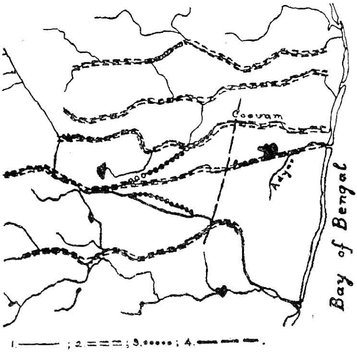


Fig. VI. *River changes in the lower Palar basin.*
1 = Present stream courses ; 2 = Probable original consequent streams ; 3 = Abandoned river courses ; 4 = Former seaward edge of delta.

The deposits of younger alluvium bifurcate about eight miles east of Arcot. The Palar flows along the southern strip which splits into two about ten miles further east, to enclose the island between the Vegavati and the Palar, and then continues, with more or less the same width, along the present course of the Palar, up to the sea. The diversion of a flood in the Palar along the course of the Vegavati is probably embodied in the following legend[2] of Brahma and Saraswathi. The God Brahma was once asked by his spouse Saraswathi to tell her who was most beautiful in all the Universe, and he was compelled in truth to answer that Lakshmi, the Goddess of wealth, was the most beautiful of all. Displeased with the unflattering reply she got, Saraswathi is said to have run away from Brahma and lived apart. Some time after this incident, Brahma arranged to perform the Asvamedhayagam at Kanchi, which place he chose specially, since it was held that one such sacrifice performed at Kanchi was equal in merit to a thousand such performed elsewhere. While he was engaged in its

2. Manual of Chingleput District.

performance, Saraswathi assumed the shape of a flood in the Palar and came down the river with the intention of interrupting the sacrifice and thereby frustrating her husband's object. Brahma invoked the aid of Vishnu to help him against his revengeful wife, and it is said that Vishnu came to his help by taking the form of a naked man and lying down across the course of the flood. This was too much for the modesty of the irate lady, who turned aside and flowed along the present course of the Vegavathi.

The other northern belt of alluvium is much wider and increases in width still more further east. It is, as Bruce Foote has pointed out,[3] "altogether disproportionate to the size of the Cortelliar river, which now flows through it." Local tradition recognises an ' old Palar,' or Vrddhakshiranadi, at Palur on the Arakonam-Conjeevaram rail route. The change which the Palar has made from this former northerly course to its present southerly direction is dated more precisely by a reference in the 'Kalingattuparani,' a Tamil poem written by Jayamkondan, who was a contemporary of the Chola king Kulottunga I (1070-1119 A.D.). The poem deals with the campaign against Kalingadesa, which was ordered by Kulottunga I when he was informed, at Kanchi, of their failure to pay the customary tribute. In describing the route taken by his army, which set out from Kanchi, the poet says that the troops crossed the Palar first, and then the Kortelliar, and other rivers after that. It appears from this that the Palar flowed north of Conjeevaram and along a course different from that of the Kortelliar at the time of this war, which took place between 1095 A.D., the 25th year of the king's reign,[4] and 1115 A.D., the 45th year of his rule.[5]

The course of the Palar at that time was very probably along that of the Cooum, which is now shown as having its rise from a tank of the same name, which is totally inadequate to account for the size of the bed which the stream has cut for itself and the amount of alluvium deposited in its valley. The Palar had therefore abandoned the Kortelliar valley before the end of the eleventh century A.D., and occupied that of the Cooum, which it has since abandoned for its present course still further south. It is along this former connection that the old Bungaru channel, now known as Place's canal, has been cut, across the sandy area separating the

3. Bruce Foote: *Geology of Madras* (Memoirs of G. S. I., Vol. X.)

4. Introduction in Gopala Ayyar's edition of Jayamkondan's *Kalingattupparani.*

5. Alangudi Inscription (S.I.I., Vol. IV, p. 136).

Kortelliar from the Cooum. The narrow, winding, intermittent stream which now occupies the bed of the Cooum river is clearly a misfit, insufficient to explain the size of the valley in which it flows. The shrunken size of the river is due to the changes in the Palar suggested previously, and the consequent decrease in the volume of the Cooum.

The former seaward edge of the delta may be taken to correspond approximately with the western limits of the marine alluvium, in the case of the alluvial tracts, and the western edge of the large outcrop of crystalline rocks between Saidapet and Chingleput. This area of crystalline rocks represents a part of the shore platform before the recent uplift of the coast, whose surface has been stripped of its mantle of weathered layers instead of being covered with newer deposits, as in the adjacent portions. The western limit of the crystalline outcrop thus marks the limit of the erosive action of the sea, and this line agrees well with the limit of the marine alluvium at Poonamallee. The delta thus defined forms a part of the mature coastal plain distinguished by Cushing.[6]

The young coastal plain which has emerged through the recent uplift of the coastal area varies much in width in different parts of the east coast of the peninsula. It is well developed to the east of the Palar delta, and its present relief has been evolved by the several meandering consequent streams. These have cut broad and shallow valleys as the first stage, and then partly filled them with alluvial deposits. Subsequently, the streams have shrunk greatly in size, and also cut down their beds in the alluvium. These streams have, in their middle courses, entrenched themselves in their former beds, whose banks now are, in consequence, twenty feet and more in height in several places.

The Palar basin thus appears to have witnessed many large changes, some of which have occurred well within historic times. A detailed and thorough investigation of the physical changes which have taken place in South India is therefore necessary as a proper basis for the study of its human history.

It may also be pointed out, in conclusion, that some of the facts mentioned in this paper, e.g., the connection between tanks and rainfall in one part of the river-basin and floods in another part, serve to show the practical need for unified and coordinated con-

6. S. W. Cushing: *The East Coast of India* (Bulletin of American Geographical Society, Vol. XLV, 1913).

trol and development of the river-system and its resources. Such a need has been only too apparent with reference to the other rivers of peninsular India, in connection with nearly every question concerning their utilisation for irrigation or power development. Though the subject is of supreme importance, the systematic study of the rivers of India has hardly yet been undertaken.

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## DISCUSSION

The paper on "*the Basin of the Palar*" published above, which was originally submitted to the Indian Science Congress at its Silver Jubilee Session at Calcutta, was read again at the Association with *Mrs. P. S. Sundara Raj* in the chair.

At the end of the paper, an interesting *discussion* ensued.

*Mr. V. D. Krishnaswami* said:—

When I first heard this same paper in the recent Science Congress I was able to get at only the tail end of it as I was oscillating between 3 sections. Today I had the opportunity to hear it completely and I must say at the outset that I congratulate Mr. Tirunaranan on this excellent piece of work in tracing the geographical history of Palar river down to historic times.

This very same problem has been engaging my attention for sometime but as it was closely interrelated with the Prehistoric Archaeology, my field of activity was necessarily restricted to the northern most channel of the cone of deposition with its apex a little below Arcot. However Mr. Tirunaranan has followed the drainage system of Palar from its source right down to the sea and has depicted the morphological features along its entire course as best as he can.

In the section of the catchment basin he has observed that the valley is broad and shallow and thinks that this part of the plateau has been subject to baselevelling more than once. Here again much light could be thrown by the analyses of spot heights and the drawing of the altitude curves which I shall be adopting for the coastal laterite plateau.

In the next section, the gorge track, he has observed that the gorge is V shaped in its upper part and Y shaped lower down at Kangundi. He thinks that this change in the form of the valley is due to some local rejuvenation in the lower part of the gorge which has not yet communicated itself with the upper portion as being to some structural resistance to river erosion.

In the section between Vaniambadi and Mailpatti lower down, he has pointed out that the river has cut its own bed quite recently below the general level of the valley floor and as being quite distinguishable from Vaniambadi as far as Ambur.

I am inclined to think from my own observation lower down, that the same rejuvenation (whether local or regional) which has caused the change in the shape of the valley from a V above to a Y below near Kangundi, has also been the same agent that caused the river in the Vaniambadi-Mailpatti section to cut its bed below the general level of the valley floor. He further thinks that this vertical cutting is quite recent which again seems to be a fairly correct guess if only the alluvial terrace in this region will be further examined for their archaeological contents of human lithic artefacts.

He puts the whole section between Vaniambadi and Gudiyattam as the dominant line of weakness in this region and ascribes this structural weakness as being due partly to the many quartzite dykes that cross this region. Till this particular area is studied in detail both geologically and geomorphologically the problem, I think, will remain a knotty one.

Lastly in the area covered by the cone of deposition the history of the Palar has suffered remarkable vicissitudes. But even here much remains to be studied and what has been attempted by me and Mr. Tirunaranan in this area only stresses the necessity for detailed investigation. The sedimentary deposits in this area have not been thoroughly distinguished. The so-called older alluvium comprises really a series of formations of widely differing ages and the laterite has been included under this heading by the G.S.I. Then there is the newer alluvium laid at a lower level below that of the older alluvium. Mr. Tirunaranan mentioned in this connection that Burkitt's paper throws light on this problem. I would mention that the problem remains still a problem and Burkitt has only attempted in his paper * to show in this river basin a series of human cultures evolving from prehistoric times.

I have shown in my paper ** that the northern limit of the Kortalayar (the Vridhakshira nadi of the legend) really shows 4 cycles of erosion and sedimentation as shown by the river profiles and as specially due to the eustatic changes of sea level. These are best seen in the 4 terraces observed in this branch.

*Geol. Mag. May 1932.

**Journal Mad. Geo. Assn. Vol. XIII No. 1 March 1938 pp. 58-90.

I shall finally close my remarks by hoping that this interesting geomorphological work on the drainage system of Palar will be immediately followed by detailed surveying of longitudinal profiles of the main and the tributary streams and correlated with the chronological sequence in its denudation. The curves if plotted will show most graphically the breaks in the profile and its composite nature. The breaks or the knick points may be either referred to the heads of rejuvenation or to hard resistant bands of structural irregularities in the nature of the country rock. It strikes me that the rejuvenation which caused the main stream in the Upper Palar above Gudiyattam to capture the tributary of South Pennar flowing S.W. might have been due to one such wave that has affected the Kortalayar lower down.

If this particular river system is thoroughly worked out and the methods of investigation properly explained to our enthusiastic students of geomorphology, I hope the other rivers of South India will be made to reveal the changes that have occurred equally in them. I have long entertained a wish that the Godavari system is a very promising field for such research as palaeontological and stratigraphical evidences are plenty for precise dating. For those interested in this branch of investigation, the methods set out by Baulig in his course of lectures on "The Changing Sea Level", will be found to be a valuable work of reference.

*Mr. N. Subrahmanyam* said that the idea of river capture in the present upper basin of the Palar is a very interesting one, and the evidences brought forward are satisfactory enough in themselves. But a more detailed examination in the Jalarpet gap of the structural and other evidences may be required before the matter may be said to be conclusively proven.

*Dr. B. Sundara Raj* stated that the well-known food fish called Hilsa, which ascends all important east coast rivers of the Presidency from the sea during the north-east monsoon floods, does not ascend the Palar but frequents the Ponnayar at Cuddalore. A Hilsa fishery occurs every year in the Ponnayar up to Tirukkoilur anicut. This possibly is also evidence that the Ponnayar was a much more important river compared with the Palar in the past. The homing instinct among fish often explains the reason why fish that do not frequent some rivers come to others. The salmon in America are well-known examples. If a river is an old one and Hilsa has been breeding in it they are bound to come back to the river every year, however small the river may become in subsequent years. I am, however, presuming that the absence of the Hilsa fishery in the Palar is not due to any natural obstruction

such as a sand bar across the mouth of the river during the north-east monsoon.

Again, regarding the question of river capture the fact of the mere narrowing of the valley towards Mailpatti is not itself convincing. It may well be asked whether there has been upheaval of the land at the Jalarpet gap.

*Miss Mary W. F. Waddington* said that one of the most conclusive pieces of evidence in the theory of the capture of the Thames headwaters by the Severn, was the presence of the wind-gaps in the Cotswolds. She instanced a similar example in the river systems of the Bristol Avon and Salisbury Avon, where the river gravels of the Vale of Pewsey gave the clue, to the history of these rivers. Mr. Thirunaranan's paper, she emphasized, was one of the most important contributions yet made to South Indian Physiography.

In his reply, Mr. Thirunaranan adduced the width of the Jalarpet gap as an important argument for believing it was part of the old Pennar basin, and stated that there was no evidence of local upheaval of land.

The changes in the deltaic section of the river referred to in the paper are subsequent to the arrival of Man, as evidenced by the implements that have been discovered in the laterite beds.

*Mrs. Sundara Raj*, in her concluding remarks stated that at Calcutta there was not sufficient time to discuss the paper, which she considered was a real solid piece of research work. There was need for further investigation on the lines suggested in the discussion for strengthening and corroborating the theory put forward regarding the question of river-capture.

The meeting closed with a vote of thanks to the President and the Lecturer.

# The Tambraparni Basin

By

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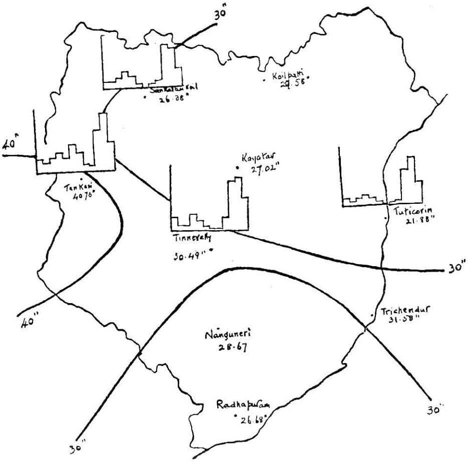
The chief motive of this paper is to describe the basin of the Tambraparni, and to point out as well how it adds a splash of green to the naturally dull brown of the vegetation map of Tinnevelly district. That entails a study of the physique and climate of the district of Tinnevelly whose centre the basin of the Tambraparni occupies.

Tinnevelly is the southernmost administrative district of British India, situated between latitudes 8°11′ & 9°25′N. and longitudes 77°10′ & 78°24′ E., bounded on the east and south by the Gulf of Mannar, on the north by the district of Ramnad, and on the west by the State of Travancore, the frontier mainly following the watershed of the Western Ghats except in a few places. The hills at the western boundary of the district are a continuation of the Western Ghats, itself the upturned edge of the Deccan plateau; and the range here averages about 5000 feet in altitude. South of Kadayanallur the hills are not so high as in the north and the main range drops down to the Ariankavu Pass (also known as the Shencottah gap). Rising again they culminate in the peak of Panjantangi above Kuttalam, and as they proceed south, the Ghats begin to widen. The beauty spot among the mass of mountains in that region is the famous Agastyamalai, the source of the river Tambraparni. From the hills, the plains gradually slope downwards to the east towards the sea.

The rainfall of the district next claims our attention. Table I gives the statistics of the average monthly rainfall for 21 stations in the district. The stations are arranged in the descending order of their annual rainfall, and as might be noticed the first 5 stations lie quite near the hills on the west. Almost three-fourths of the annual rainfall in all stations is received during the north-east monsoon. From the graphs of rainfall drawn for some typical stations, it is seen that the maximum amount of rainfalls in November; and there is also a subsidiary maximum in April, when due to the "mango showers" 17 stations out of 21 get more than I inch of rainfall, Tenkasi getting 3 inches of rainfall then.

## Table I—Average monthly rainfall statistics for stations in Tinnevelly District.

| | | Rainfall in inches | | | | | | | | | | | | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | J. | F. | M. | A. | M. | J. | Jy. | Ag. | S. | O. | N. | D. | Total. |
| 1. | Tenkasi ... | 2·15 | 1·48 | 2·32 | 3·00 | 2·13 | 4·28 | 3·05 | 1·33 | 0·93 | 6·68 | 8·89 | 4·52 | 40·76 |
| 2. | Kadayam ... | 3·75 | 1·15 | 1·81 | 1·90 | 1·82 | 1·85 | 1·74 | 0·98 | 0·84 | 7·58 | 10·12 | 6·84 | 40 38 |
| 3. | Sivagiri ... | 2·80 | 1·88 | 1·89 | 2·67 | 1·61 | 0·99 | 1·20 | 1·01 | 1·32 | 9·20 | 9·31 | 3·73 | 37·61 |
| 4. | Anbasamudram ... | 2·48 | 1·46 | 1·89 | 1·98 | 1·67 | 1·37 | 0·82 | 0·52 | 0·52 | 5·83 | 9·92 | 6·28 | 34·74 |
| 5. | Kadayanallur ... | 2·11 | 1·04 | 1·88 | 1·88 | 1·24 | 2·20 | 1·22 | 0·75 | 0·92 | 7·59 | 8·13 | 4·02 | 32·98 |
| 6. | Tiruchendur ... | 3·70 | 1·06 | 0·93 | 0·84 | 0·49 | 0·13 | 0·19 | 0·16 | 0·22 | 6·42 | 11·37 | 6·07 | 31·58 |
| 7. | Tinnevelly ... | 1·88 | 0·38 | 0·64 | 2·38 | 1·61 | 0·50 | 0·36 | 0·39 | 1·85 | 7·27 | 8·16 | 5·07 | 30·49 |
| 8. | Koilpatti ... | 1·30 | 0·51 | 0·51 | 2·56 | 2·45 | 0·70 | 0·76 | 1·45 | 2·31 | 7·15 | 7·13 | 2·75 | 29·58 |
| 9. | Nanguneri ... | 1·50 | 1·00 | 1·71 | 1·74 | 1·42 | 1·05 | 0·40 | 0·61 | 1·13 | 5·85 | 7·57 | 4·69 | 28·67 |
| 10. | Palamcottah ... | 1·50 | 0·80 | 0·95 | 2·49 | 1·57 | 0·56 | 0·38 | 0·56 | 1·30 | 6·82 | 7·41 | 4·00 | 28·34 |
| 11. | Kayatar ... | 1·42 | 0·58 | 0·75 | 2·48 | 1·63 | 0 23 | 0·75 | 1·12 | 1·46 | 7·40 | 6·44 | 2·76 | 27·02 |
| 12. | Radhapuram ... | 0·85 | 0·72 | 1·52 | 1·60 | 1·14 | 2·21 | 1·21 | 0·50 | 0·46 | 5·86 | 7·03 | 3·68 | 26·68 |
| 13. | Kulasekharapatnam ... | 1·48 | 0·97 | 1·22 | 1·27 | 0·59 | 0·35 | 0·19 | 0·15 | 0·23 | 5·47 | 9·09 | 5·49 | 26·50 |
| 14. | Sankarankoil ... | 1·12 | 0·97 | 1·52 | 2·63 | 1·76 | 0·63 | 0·45 | 0·52 | 0·95 | 6·52 | 6·19 | 3·12 | 26·38 |
| 15. | Sattankulam ... | 1·18 | 0·80 | 0·54 | 0·86 | 0·92 | 0·43 | 0·37 | 0·62 | 0·94 | 6·98 | 7·69 | 4·02 | 25·37 |
| 16. | Ottapidaram ... | 1·19 | 0·59 | 0·82 | 1·50 | 1·35 | 0·39 | 0·39 | 1·01 | 1·56 | 7·00 | 6·64 | 2·78 | 25·22 |
| 17. | Srivaikuntam ... | 1·22 | 0·70 | 1·14 | 1·39 | 1·39 | 0·33 | 0·32 | 0·55 | 1·07 | 6·08 | 7·18 | 3·79 | 25·16 |
| 18. | Vilattikulam ... | 0·87 | 0·60 | 0·89 | 1·63 | 1·22 | 0·33 | 0·42 | 1·59 | 2·19 | 6·97 | 5·97 | 2·38 | 25·06 |
| 19. | Kiranur ... | 1·91 | 0·52 | 1·79 | 1·17 | 0·54 | 0·16 | 0·15 | 0·15 | 0·23 | 5·47 | 0·09 | 3·99 | 23·32 |
| 20. | Arasadi ... | 1·45 | 0·78 | 1·13 | 1·41 | 0.75 | 0·21 | 0·18 | 0·26 | 0·53 | 6·46 | 6·55 | 2·98 | 22·69 |
| 21. | Tuticorin ... | 1·11 | 0·64 | 0·96 | 1·58 | 0.88 | 0·18 | 0·13 | 0·26 | 0·58 | 5·27 | 7·09 | 3·20 | 21·88 |
| | District Average ... | 1·75 | 0·89 | 1·23 | 1·86 | 1.34 | 0·91 | 0·70 | 0·69 | 1·03 | 6·68 | 7·89 | 4·10 | 29·07 |



Annual Rainfall Map of Tinnevelly District.

Besides, we find another subsidiary maximum in the rainfall graphs of Tenkasi, Kadayanallur and Sivagiri, all stations lying near the hills. During June and July when the rest of the district is almost dry, these stations get over 2 inches of rainfall, Tenkasi again getting more than 7 inches of rain, due to its situation directly east of the Shencottah Gap. The other stations near the hills get the benefit of the south-west monsoon because of the tipping of the precipitation just over on the lee-side of the Ghats.

On a general consideration, we find that, of all the districts lying on the south-east coast of the Madras Presidency, Tinnevelly is the driest, as seen from the figures of rainfall given below.

| | |
|---|---|
| Annual Rainfall of | |
| Chingleput | .. 46.63" |
| S. Arcot | .. 46.09" |
| Tanjore | .. 44.94" |
| Ramnad | .. 31.05" |
| Tinnevelly | .. 29.07" |

In fact there are only 4 districts in the Presidency with a lower rainfall than Tinnevelly, viz., Coimbatore, Kurnool, Anantapur and Bellary.

In the centre of this naturally dry region of Tinnevelly, we find a fertile zone, a green patch in the dull brown of the district, viz., the basin of the Tambraparni. Excepting the valleys of the Tambraparni and the Chittar, which lie within the zone of 30-40 inches of annual rainfall, and the narrow belts of country along the Ghats, the rest of the district is at the mercy of the seasons.

The Tambraparni may be said to be a gift of the gods to the parched plains of the Tinnevelly district. In fact the *mahatmyam* gives it a divine origin, but we need not digress into it now. The Tambraparni from its source in the Agastyamalai (6132 feet in altitude) to its mouth in the Gulf of Mannar is 75 miles long and drains an area of about 1750 sq. miles. Having a large catchment area in the Ghats, it enjoys the benefit of both the monsoons and its bed is never dry. From Papanasam where it emerges from the hills to its mouth, a course of about 60 miles, the fall of the river decreases from about 6 feet to a mile in Ambasamudram taluk to 3 feet in Srivaikuntam taluk; and the river-bed widens from 300 feet in Ambasamudram to 1380 feet in Srivaikuntam taluk.

The river itself is of ancient fame, and has been mentioned in the Puranas, the Ramayana and the Mahabharata, and in the inscriptions of Asoka at Girnar. Of its innumberable tributaries, we need mention only the Pachaiyar which joins the river from the south, and the Chittar, a river second only to Tambraparni in importance, which joins the main river at Sivalapperi. Water is carefully conserved with the aid of the anicuts throughout the course of the river, and irrigation by canals is carried on systematically. With all its tributaries, the Tambraparni includes in its basin the Tenkasi, Ambasamudram and Tinnevelly taluks, most of Srivaikuntam, much of Tiruchendur and a part of the Nanguneri taluk.

A regional division of the district helps us to contrast the basin with the rest of the district. The chief regions are:

1. The valleys of the Tambraparni and the Chittar.

2. The dry red lands in the centre of the district. (the river valleys excluded).

3. The region of sand-dunes in the east and south-east of the district.

4. The plains of black cotton soil to the north.

First in importance comes the Tambraparni basin varying in width from 3 to 6 miles and extending from the middle of the Ghats

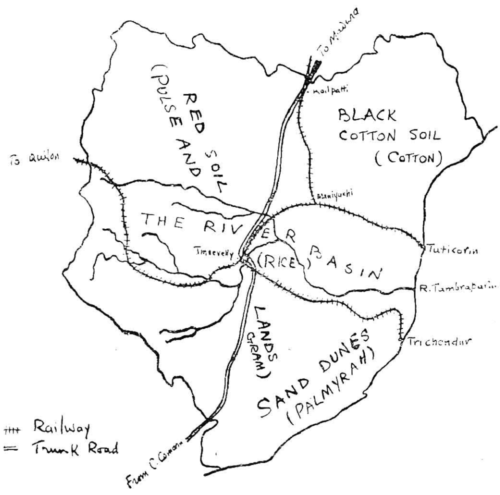
right through the district. It is the fertile and productive zone of rice fields in the district. Large villages and towns with high buildings and higher temple towers are found nestling amidst a sea of waving rice-fields and cocoanut and mango groves. Most of the fields give two good rice crops annually and the best of them are in cultivation for ten months in the year. The varieties of paddy grown are too numerous to be mentioned. The chief variety is known as the Anaikomban (giving a long thin white grain when husked). Next in importance comes the Samba giving a short thick grain; other varieties as Kulavalai, Kuruvai and others are common. In addition to the regularly irrigated crops, one or two "dry" crops requiring only occasional irrigation are grown on these lands, usually chillies, vegetables and gingelly.

In this basin lie the important towns of the district, Tinnevelly and Palamcottah. The name of Tinnevelly (Tiru-nel-veli in Tamil) literally means a town surrounded by rice fields. It had been the southern head-quarters of the Pandya kings of Madura. Palamcottah is now the district head-quarters. As population is denser in the valley than in the other parts of the district, the railway from Tinnevelly to Tenkasi, instead of taking a straight route, winds along the valley. The District Board railway serves the needs of the valley east of Tinnevelly.

In contrast to this verdant rice-field region of the river basin, we find the dry red lands rising from the river valleys and extending over much of Sankaranainarkoil and western Koilpatti, the uplands of Ambasamudram and Tinnevelly, and the greater part of Nanguneri and much of north Srivaikuntam taluk. These are wide areas of dry red sandy lands spotted with innumerable tanks and small patches of paddy cultivation. Palmyrahs are abundant throughout this tract ; except where wells have been sunk, the land is not cultivated, and even where cultivation is attempted, the yield is only comparatively poor crops of pulse and gram. The region of the sand dunes along the south-east coast is a veritable palmyrah forest, and cultivation is carried on only in patches in the shallow depressions among the dunes.

To the north of the Tambraparni basin we find the black cotton lands of Koilpatti and north Srivaikuntam taluks. For 9 months in the year this part of the district is most uninviting. But for the other 3 months, the tall crops of cumbu and cholam lend some colour to the view. The cotton plants though remaining longer in the ground, are not much of a scenery.

Examining the industrial development of each of these regions, we find that there are ample potentialities for the industries of the district getting concentrated in the basin itself. The present industrial development of the basin has not gone far. Apart from rice-milling, the only other industry of mat-making is in the hands of a




Economic Map of Tinnevelly District.

few Mohamedan families at Pattamadai. About the cotton industry in the basin we shall have occasion to refer later. In the black cotton lands to the north of the basin, a number of ginning factories and steam presses have been set up at Kadambur, Nalattinputtur and Koilpatti. There are spinning mills at Koilpatti and Tuticorin.

At Papanasam, there is a cotton mill on the Tambraparni, utilising the hydro-electric power from the falls there. This is an indication as to how a greater development of hydro-electric power at the head of the basin could help to centralise the cotton industry of the district.

To the south of the basin the palmyrah forest stretches almost continuously along the sand dune regions of Nanguneri and Tiruchendur taluks. There are about 9 million palmyrahs in the region,

and even in the red soil country outside the zone it could be seen in clusters along the tank-bunds and in patches of high ground. Even though the poet waxes eloquent over the hundreds of uses to which the palmyrah could be put, we are concerned here only with the tapping of the tree ; it is only as a producer of juice that the palmyrah is of great economic significance to us.

Only a small portion of the juice is consumed as sweet juice or as fermented liquor, the rest is boiled to make a coarse kind of sugar called jaggery. The jaggery is then bought up by the sugar refineries outside the district. Besides the East India Distillery Co. there is an Indian managed factory at Tinnevelly and another at Alwartirunagari, but both the latter are small, very inefficient and often change hands. Here is an instance again where improved hydro-electric developments at the head of the Tambraparni basin would help to centralise the factories for refining sugar..

Even in the grouping of the people of the differing castes in the district, we find a singular alignment. Population is fairly dense in the district, density being 474 per sq. m., the Hindus forming 84%, the Christians 10% and Mohamedans 6%. The basin itself is cosmopolitan in regard to the distribution of people of the several religions and castes. But we find the Mohamedans concentrated only in Tinnevelly, Tiruchendur and Tenkasi taluks. In the black cotton lands we find the Vadugars and Kammavars (commonly known as Naidus) and Reddies concentrated. The Paravars (fishermen) mostly converted to Roman Catholicism are found along the Tiruchendur coast. Along the sand dunes we find most the Shanars, because theirs is the profession to tap the palmyrah for juice.

In the basin of the Tambraparni itself,, the Hindus are a set of peace-loving folk, cultured and economically well-off. Conversions to Christianity were rather brisk till very recently when due to the anti-untouchability campaign, the " depressed classes " from whom mostly the converts were drawn preferred to remain in the Hindu fold. Conversions to Mohamedanism is practically nil in modern days.

Before concluding we should mention the immense potentialities of the basin of the Tambraparni in the future development of the regions. The head of the basin holds great possibilities of hydro-electric developments, and could concentrate in itself the cotton and sugar industries of the district, tapping the resources of the northern part of the district for raw cotton, and drawing supplies of coarse sugar from the sand dune areas of the south-east.

# " Four Main House Types in South India : Their Geographic Controls "

By

K. M. Subrahmanyam, M.A., L.T., Dip. Geo.

## I

Houses are representative of brief periods of time only, as they last but a comparatively few years of time in the history of a people. They are pulled down or they fall into ruins when new ones are built in their place, so that the types of houses indicate to an extent the stage of civilisation and arts attained by a nation at a particular age. But wherever the form is preserved through the ages, the cause may be traced to both tradition and utility in the type of house. Man has the peculiar tendency to respect tradition and keep on to time-honoured customs not only when they do not cost anything or interfere with progress, but even when the addiction to such tradition and custom is economically unsound, and impedes progress. The construction of pials in the South Indian houses may be cited as an example. The original intention of our ancients and the purpose that these pials serve have been lost sight of. They continue to occupy the front of every house in spite of the introduction of the iron gratings which bound these pials, preventing their use by any outsider.

The plan, structure and material used in the construction of human house depend upon environment. We often see that big and celebrated buildings are in brick while ordinary dwelling houses are of stones and slabs. We also see how the pattern of the house depends upon the material used and the climatic conditions of the locality, e.g., we have flat-roofed stone houses in the Ceded districts area where rainfall is scanty, whereas in Malabar where rainfall is heavy the houses have roofs with high gables, timber from the neighbouring forests entering largely into the construction.

While urban houses are conditioned more by the space available and the relative value of the site, rural houses are generally isolated and these isolated houses show the characterestic dependence upon geographical environment. We, as geographers, are interested not in the abnormal types. The existence of a house paved with Italian marbles in South India does not represent any of the normal features of the South Indian Tamilian house. Abnormal type

speaks only of the individual taste of the owner. A student of comparative architecture may erect a house in the Persian style in South India, but it will not represent the average South Indian dwelling. An Indian returning from Switzerland may transplant one of the Swiss chalets here. But to speak of it as the typical Indian house will be a geographical absurdity. Exceptional cases are, therefore, of less value in the study of human geography. Our interest is in the material of construction and the general plan.

Travel affords immense facilities for the study of the geographical control of human habitation. .Taking a wide survey we see broad variations in the houses in the several natural regions of the world. The Eskimo living in the land of the lowest temperature and of perpetual snow, with no natural vegetation to speak of, has his house built of snow. The material, he uses, is the only one he can obtain. It will be monstrous for a man in the tropics to think of a snow house. The Eskimo crawls into his residence as the doorway has perforce to be short and narrow to keep away the snow and the biting cold.

Again the hut with stone walls and a thatch for the roof in the steppe region or the hut built on piles in Sumatra, not for safety from the wild beasts but to avoid the noxious vapours arising from the damp equatorial soil, can best be reasoned out only by a reference to geography..

There are also instances where one has to note not merely the material of construction but note the manner of the utilisation of Nature, e.g., the excavation of caves for dwelling houses on the sides of hills. The roofing material of the house in all climates is still a difficult and a delicate problem, and man solves it as best as his environment would help him in the matter.

## II

Practically every locality has its own type of dwelling house with typical features. But not all of them have certain common features which bespeak their location. For purposes of this paper Madras Presidency has been divided into four main areas, the Ceded Districts, Malabar, Northern Circars and the Tamilnad. From each is taken the typical house of a middle class man. Every area can present to us a number of variations in the construction and material of a house, each bearing a relationship to the relative opulence of the owner. The poorest member of the society may own nothing but a few shreds of rags loosely placed on odd stems he easily collects, to protect him from sun and rain, while the

moneyed class may spend their millions to build their palaces of marbles and mirrors. We shall, therefore, confine our studies to the habitation of the middle class man. Each of the areas taken above represents a typical climatic region, peculiar soil conditions and peculiar tradition. There is also the strange coincidence of the language element in the classification, though not much of geographical capital can be made from that coincidence—Malabar area has Malayalam, the Southern districts Tamil, the Circars Telugu and the Ceded Districts Canarese and Telugu.

## III.

## THE CEDED DISTRICTS TYPE.

Taking first the Ceded Districts type we find here that in general, houses with stone walls and flat roofs without a central courtyard predominate. Clay which makes good tiles is rare in the black soil country. This is a region of scanty rainfall and extreme temperatures. The annual rainfall is generally below 20″. The temperature ranges from 60° to 100° and more. Poor rainfall does not oblige the inhabitants to go in for a house with sloping roofs with high gables. It has also been noticed already how paucity of good and suitable clay prevents the manufacture of tiles and bricks. We, however, find stones of the Cuddapah series widely available in the hills in the region. These rocks enter into the construction greatly. The walls are of stone and the joints are plastered with mud. The roofs are flat and consist of horizontal rafters upon which are piled faggots and a foot or so of earth, the whole being coated inside with clay. Ventilation is obtained through circular openings in the roofs which are covered with earthern pots in the hot weather. The ceiling, however, leaks in heavy rains.

While the general features enumerated above are noticeable almost throughout the region, minor variations are found here and there, due probably to the exigencies of local conditions, tradition and historical vicissitudes in the past. In Penukonda and the surrounding places, the centre of the roof is provided with a watch tower. Some houses have lofty outer verandahs supported by wooden pillars. There is no backyard or courtyard.

In the Bellary region the houses are surrounded by high walls and so they look like small forts. Provision is made for only one doorway, windows being conspicuous by their absence..

Moving eastward in this region, one is struck by the extent to which the Cuddapah slabs come to be used. The Cuddapah District exports these slabs largely to the neighbouring districts.

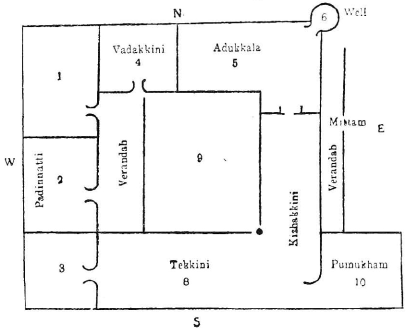
This material, which is available so largely, enters into the construction of houses and even public buildings in a variety of ways. The slabs are used in a variety of ways as walls, flooring, roofs, almyras, parapets for wells and verandahs. In the roof there is a square opening for ventilation in contrast to the circular opening found in the Bellary houses, for the slab takes the place of the pot as the covering for the ventilator in the hot weather.

Nearly all the houses are provided with verandahs; but from the verandah one descends to the street and not, as in the Tamil country, to an outer verandah or pial. The house is generally divided into two halves one of which contains living rooms and the *Devuni moola*, the family chapel, and the other the *gariselu* or the miniature barn.

## IV.

## THE MALABAR TYPE

Even a casual visit to the West Coast is enough to impress one with the contrast that the dwelling house there bears to that




1. Pettu-kidakkunna-muri (lying in room). 2. Store room. 3. Sleeping room. 4. Dining room. 5. Kitchen. 6. Well. 7 and 8. Open halls and verandahs. 9. Open courtyard. 10. The portico.

of the other parts of the Presidency. At the outset one is struck by the absence of the well-knit village or street. The true Malayali does not live in houses built contiguously in a street. Each house stands separate in a little compound or garden with several plants and a tank in it. Even the very poor person, who feels rich enough to own a house, builds it in a garden. The house stands in the middle of the garden, which is surrounded by fields.

The gate of the compound, called the Padippura is approached from the paddy fields by a ladder. The ground floor has two platforms on which the master of the house sits and chats with his friends.

The compound itself is roughly divided into four parts and the house occupies the south-west angle of the north-east corner. The south-east is the burning ground. In the north-east is found the tank along with the Pambankavu (the snake corner). There are separate places for cowshed and threshing grain. The main front is generally to the east. There is an open court-yard in front called the '*mittam.*'

The typical and complete Malabar house is based on what is known as the "*Nalupura*" plan (the quadrangle). The construction is on the four sides of a central courtyard, known in Malayalam as Nadumittam. The wings on the four sides derive their names from the directions in which they are situated in relation to the central courtyard, as the Vadakkini (north wing), the Tekkini (south wing), the Kizhakkini (east wing) and the Padinnatuni (west wing). Though all the houses are not built with all the four wings, still they are supposed to have been so built and are imagined to form a part of a Nalupura.

All houses invariably have sloping roofs with high gables. The houses themselves are built on a higher level than the surrounding ground. Malabar gets heavy rain from the South-West Monsoon which accounts for the construction of houses with gables, on high ground. Proper drainage arrangements have to be made in this region of heavy rainfall. The roofs are sometimes of plaited coconut leaves, as coconut palms are largely grown here. The coastal towns specialise in the manufacture of tiles for which suitable clay is available.

The monsoon rain and the tropical sun help the growth of thick forests on the western slopes of the Western Ghats. These forests supply the timber that goes largely into the construction of houses here. If in Cuddapah we note slabs used for walls, ceiling, roofing and almyrahs, we find here timber used similarly for these and a number of other purposes as well. Below the roof practically in all houses, is an attic which serves as store-room.

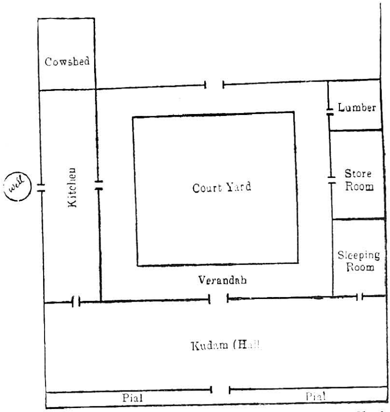
## V.

## THE NORTHERN CIRCARS TYPE

The average ryot's house of the Godavari District may be taken to represent this type. There are certain features common

to these and the Malabar houses e.g., the sloping roofs with high gables. This is because the Circars also receive fairly good rains.

The houses seldom have terraced roofs and are generally thatched with palmyrah leaves. Tiles are common in towns, but much less so outside them. Under the roof a terrace or a ceiling of mud is often made with the double object of serving as a loft house or store house, and of protecting the house itself,




The Northern Circar type—'Manduva illu' (courtyard house).

if the roof gets on fire. The walls are of mud; and brick and stone are comparatively rare. In the Agency the walls are of split bamboo sometimes smeared with mud. Outside big towns, houses of two storeys are rare. Junglewood also enters into the construction largely along with bamboo in places bordering the Agency tracts.

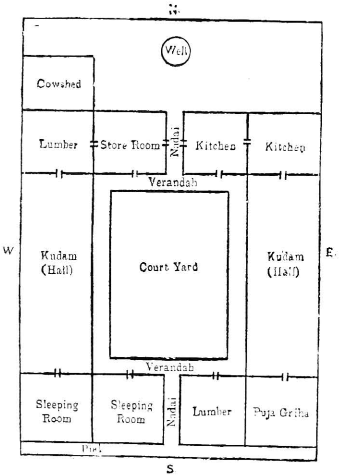
The houses are of two types, called the *Chavadi illu* or hall-house and the *Manduva illu* or court-yard house, which is also called the 'four room house.' Both have narrow pials in front. The essential difference is that in the chavadi illu the door leads into a long broad hall which stretches from the front of the house to the back, with rooms at the sides; whereas in the other the hall is a narrow passage running from one side of the house to the other from which a door leads into the courtyard, open at the centre but surrounded by verandahs, out of which the rooms open. The latter kind is most commonly used by the higher

classes and resembles the typical house of the southern country in having an opening (*manduva*) in the middle of the courtyard to let in light. The kitchen is usually located in the western part of the house and it has, therefore, come to be called the *Padamati illu* even when it is not actually so situated.

## VI.

## THE TAMILNAD TYPE.

The average house-holder of the Tamilnad builds for himself a terraced or a tiled building, the latter preponderating over the former in most places. The roofing material used is mostly the terracota tile, good earth for the manufacture of tiles and




South Indian (Tamilian) type of house.

bricks being largely available. The walls are of bricks. In some places, however, coconut and palm leaves and straw are used for thatching purposes. Houses are generally of oblong shape and consist invariably of the street pial, and the interior open courtyard with the verandah going all round it. South-facing positions are preferred as that helps the occupant to enjoy the "southern breeze" in summer and ward off the cold northern breeze in winter. This arrangement shows how the climate is equable

and bracing. The gentle slope of the roof indicates the moderate rainfall this region gets.

The houses are mostly of a stereotyped plan. Each is entered through a *Nadai* (passage) or a hall leading into a verandah (*Talvaram*) and courtyard, surrounded by verandahs. Part of the latter is higher and wider than the rest on one side and is called the *Kudam.* The centre of the courtyard, called the *Mutram,* is open to the sky and admits of much sunshine and air. Sometimes it is sheltered from the rain by a small detached roof raised on pillars a few feet above the rest of the roof. Out of the verandah open the rooms and the kitchen; and at the back of it is the cattleshed.

Summing up we see flat-roofed stone houses in the Ceded Districts, so constructed as to protect the dwellers from the severe heat of the sun, the rocks and slabs locally available being used. In contrast thereto we find in Malabar timber entering into the construction. Here the buildings are on high ground and have sloping roofs, both necessitated by the heavy rainfall the region gets. The thickly wooded forests supply the necessary timber. In the Circars the houses are of mud and tiles or thatch. In the Tamilnad we have tiled brick houses with open courtyard reflecting an equable climate and moderate rainfall. This sketchy outline needs, however, amplification by a detailed study of the local varieties of each of the types noted above.

# A Discussion on the Teaching of Geography in India*

*Dr. S. P. Chatterjee* of Calcutta opened the discussion with the following speech .: —

I feel happy to open to-day's discussion on the teaching of Geography in India as I think it may enable us to find some means of impressing educational authorities that Geography should not occupy any subsidiary or doubtful place in our educational institutions. I admit that a great deal of lee-way has to be made up if we are to give the subject its proper place in our schools and colleges. The actual teaching of geography is most disappointing at the moment. Of the hundreds of colleges affiliated to the 18 Indian Universities only five or six teach geography in B.A. or B.Sc. classes and only one University provides facilities for the study of geography in post-graduate classes. A glance at the Universities Year Book and the presence of so many eminent British Geographers here in this gathering should convince one how things are different in the United Kingdom. There, every University has a separate geography department where the student may work for the highest degree. Besides the Universities and the constituent colleges, there are in England training colleges for undergraduate teachers, who have to study the subject-matter of Geography along with the method of teaching. In India the training colleges are hopelessly inadequate in number, and cannot provide ample facilities for the study of geography. In the limited time at his disposal the geography teacher in a training college cannot do proper justice to the subject-matter of geography as practically the whole of his time is devoted in explaining how to teach geography. The teacher thus trained returns to his school not knowing fully what to teach; he carries on his business as usual, the old discarded bay and river geography. When the trained teacher is like this, what more can be expected from the untrained teachers who form a majority in practically every school and compel their pupils to memorize definite materials from the prescribed text-books, without understanding them properly. A certain amount of memory work is perhaps essential as the critic of the modern method of teaching geography often

* This discussion took place at the Geography and Geodesy Section of the Silver Jubilee Session of the Indian Science Congress at Calcutta.

complains that many of the school-boys do not possess enough of factual knowledge. If I remember right, Prof. Fawcett, when he was in the University of Leeds, carried on some investigation to test the validity of the criticism. He prepared a set of questions and circulated it to geography teachers of secondary schools and training colleges with the request to dictate the questions in their respective classes and to report to him the results. The reports which he received generally agreed that the test had discovered a weak place in teaching and pointed to the need for more use of the atlas and greater insistence on accuracy together with a need for driving the facts home. We should keep this in view, though not over-emphasizing the importance of fixing in the memories of pupils a definite knowledge of facts.

In primary schools and lower forms of secondary schools the teaching of geography should be correlated with that of handwork, nature study and history. In the first stage no distinction should be made between geography lessons and nature study lessons; in fact the nature study lessons which mean mainly the observation of plants and animals and of physical environment of the children provide materials for many of the elementary notions of geography. The primary object of the teacher would be to awaken the children's interest in their immediate surroundings. This point should receive careful attention of every type of geography teacher in India, as probably in no other part of the world so much unreality has been linked up with the teaching of geography.

School journeys to various places in the neighbourhood of the school area should be frequently arranged with a view to establishing a closer contact between the child and his immediate surroundings. In this connection I would like to tell you about a geographical excursion arranged by Miss Broom of the Froebel Educational Institute, London for her pupils. A party of children of ten to twelve years old was taken to some farm at Stockbury, Kent for a five-day excursion to allow them to see for themselves the measuring and surveying used in map-making, and to understand how the earth is built up by nature and used by mankind. The children kept themselves busy all the time. They visited the chalk quarries, the mud flats deposited by the Kentish rivers, and studied the vegetation and elementary geology as exemplified in the Weald area. They learnt the uses of the clinometer in measuring the slope and measured as many as 24 rises, the whole length of a road and the area of a field with a surveyor's chain. The children thus did a good amount of work and yet they could say to Miss Broom on

their way back home: "You said that we were going to work, but it has been a holiday in the middle part of the term." This is a very good example of how the play-way method can be introduced in the teaching of geography.

In the higher forms of secondary schools geography should be introduced as a separate branch of science, and a planned continuity of geographical training should be offered. The teaching work should be entrusted only to those who have made a special study of the subject. We must make it clear that in this age of specialisation the teachers possessing no academic qualification in geography must make room for the specialists in the subject.

In offering advanced course in geography at the University stage, we must guard ourselves against the danger of being side-tracked by other sciences, which can only be avoided if we have a clear knowledge of the proper aim and method of modern geography. For instance, it is of little importance to the geographer to know that a district is formed of rocks of either Lipak series or Lilang system. What is important to him is that he should know what kind of rocks it is formed of, with a view to finding out the origin and evolution of the topographical features of the district which ultimately govern the activities of man.

I have put forward just a few suggestions; and other speakers will have their say in the matter. But you will all agree with me that we should take advantage of the presence of so many eminent British geographers here for furthering the cause of geography in India. I suggest that a circular letter be drafted and sent under their signature to all the University authorities in India, stressing the importance of geography and requesting them to provide facilities for higher studies in geography. I have another suggestion to make. I believe that public opinion in favour of geography has yet to be created; and this can be done effectively through geographical associations. At present so far as I know there are two such organisations, one in Madras and one in this city of Calcutta. I understand that geographers in other provinces are willing to start such associations in their areas. When that is done, we may then federate and have a central organisation for the whole of India. Professor Subrahmanyam, I believe, will tell you more about this scheme. The sooner we have such a central organisation the better, as we have to solve many problems regarding the teaching of geography, such as the standardisation of a central museum with a view to lending geographical specimens, models, slides, and films for use in schools and colleges.

*A lively and interesting discussion ensued.*

*Miss Mary W. F. Waddington* of Madras, who spoke next, pointed out that the difficulties of teaching geography in different types of schools were different, and summarised them as follows:—

1. In those institutions taking English certificates, the difficulty is one of orientation of syllabus, partially constructed for overseas centres but still largely controlled by English requirements.

2. In schools taking Indian School certificates, the difficulties are numerous; but the worst of them is that of a stereotyped syllabus taught by untrained teachers.

3. In the Training Colleges, there is the difficulty of teaching the advanced methods with no background of accurate knowledge.

4. In Arts Colleges, there is the drawback of trying to teach too much; e.g., in Madras, the Intermediate courses are as advanced as the English pass degree courses. Consequently, the knowledge obtained was often largely superficial.

The whole problem is, therefore, one of geography not yet having obtained its proper recognition in the Degree courses.

The problem is complicated in girls' schools, because excursions and outdoor work must of necessity be limited in nature.

*Mr. George Kuriyan* of Madras next spoke as follows:—

The real difficulty of teaching geography is due to the lack of qualified school teachers. It may be true there are two Universities in India with degree courses in geography, but at present the number of adequately qualified school teachers is extremely few. The students who undergo training in geography under unqualified teachers, hardly know anything even while at school, and much less after they have left it. The Directors of Public Instruction and Ministers of Education in the several provinces must be approached; and they must be requested to see that the teaching of geography in schools should only be done by qualified persons who have had academic training in the subject for at least one year in a University, in addition to that in a Training College. This can be effected easily firstly by restricting all future recruits for the teaching of geography in the Department of Education to trained students of geography, secondly by not permitting a teacher of history or any other subject, to teach geography, and thirdly by affording facilities, (leave, permission etc.) to the existing teachers

of geography to undergo training for a period of at least one year in a University. The only way of obtaining qualified teachers of geography should be by creating pass and honours degree courses in all the Universities, for which all facilities must be provided, and thus give geography the status that it has obtained in the foreign Universities.

*Mr. S. Muthukrishna Ayyar* of Madras said that Geography sould not be jammed between geology and history, but should be allowed to have an independent place and an independent development of its own, unhampered by the votaries of the marginally related subjects. There should be a practical incentive provided for the teaching of the subject by the authorities concerned by insisting upon a minimum qualification for those who are to handle the subject in secondary schools. As the secondary training course is one of two years, there is scope for more work being done both for subject-matter and methods. He put in a strong plea for the general recognition of the importance of the study of local geography at all stages.

*Mr. C. Raghunathan* of Madras desired to lay the emphasis on the teaching of geography in elementary schools, as it formed the real foundation for the study of the subject at all the higher stages. He deplored the neglect of the home region, the cramping nature of the overburdened syllabus, poor equipment and the absence of excursions. A great responsibility lies on the training schools, which prepare the teachers of the elementary schools.

*Mr. A. N. Basu* of Calcutta stated that the problem of geography teaching is threefold:—(a) paucity of the right type of teachers; (b) paucity of materials; and (c) paucity of the right type of text-books. Others had spoken at length on the first two aspects; but not enough emphasis has been placed on the importance of the right type of text-books. He then said:—

"Text-books can never be displaced. The common geography text-books deal with unreal geography. Geography is mostly written from the standpoint not of Indian students but of students of other climes and other countries. Knowledge to be real must be interpreted in terms of the known and the familiar. But if the ideology is essentially unfamiliar, interpretation through unfamiliar ideology is apt to be unreal. We must have text-books written by Indians from the Indian standpoint so that the knowledge is expressed in familiar terms, and it leads to deve-

lop in the mind of our children a real image of the world as it actually is. The real aim of geography teaching is to give a real scientifically accurate picture of the world stage on which the drama of human life is being enacted. I am afraid the present-day teaching of the subject fails utterly and absolutely in achieving this ultimate aim.

*Mr. A. K. Banerjee* of Calcutta said that in the newly started Department of Geography of the Calcutta University two batches of 100 teachers each were trained in a three-months course; and it was found utterly inadequate, as there was hardly time for crowding into it both subject-matter and methods of teaching. In the schools themselves, the apparatus was of the poorest sort; and it was not found possible to get pictures, films etc. on loan as they could be got in England. He repeated what the previous speaker said about the need for the preparation of text-books suited to our own country. The great desideratum is to make the geography teachers geography-minded; and for that purpose he felt that one Geographical Society was not enough for the whole country; and that even the provincial societies, like the Calcutta Geographical Society should have branches in the districts.

*Miss Gasper* of Calcutta said that in her experience of teaching geography for the last 26 years in one of the biggest boys' schools of Calcutta, she had had to teach geography when there were good books available as well as when there were no books in the earlier period. Even in those days she found no difficulty in teaching geography to children, as it was easily possible to take them out to the field and make them use their powers of observation in the study of the physical and the human aspects of the Home Region. She put in a strong plea for plenty of out-door work, use of one-inch maps, nursery rhymes etc.

*Dr. L. Dudley Stamp* of London opined that the basis of the whole trouble is that there is movement in a vicious circle, which has to be cut somewhere. There is no gainsaying the fact that conditions of teaching the subject in schools as well as the position of the subject in the Universities and the constituent colleges are equally unsatisfactory. Improvement in the one is bound to bring in improvement of the other. The malady can be cured only by persuading the powers that be to take the right course of action. In the actual teaching of the subject, the teacher of geography has to keep to himself the purpose of geography and the logical sequence of it. Text-books are unreal; and they can be made real

only by the teacher. Logical principles are for ourselves and not for the pupils.

*Mr. N. Subrahmanyam* of Madras in rounding off the discussion agreed with Dr. Stamp that the vicious circle with regard to geography teaching in schools and colleges should be cut as early as possible, and added that progress should be made all along the line in order that it may be effective and permanent. He was glad to find that there has been a thorough discussion of the subject from all points of view. Universities and Departments of Education have to be persuaded to take immediate steps to provide facilities for study of geography and to give the requisite training and insist upon the right qualification for the teacher of geography, while it is incumbent on the Geographical Associations to create the public opinion. The problem seems to be more or less the same in all provinces; and consequenty this discussion has been highly valuable.

# Impressions of My Trip Round the World

By

Mrs. P. S. Sundara Raj, M.R.S.T., F.R.G.S.

Last year I was so fortunate as to be able to make a journey right round the world in the course of which we touched at more than 14 countries. I cannot say that my acquaintance with each and every one of these countries is very profound; our time was too short to allow of a stay in every attractive port we visited, but in most of the countries in which we were able to make even a brief stay we were very fortunate in being able to see not only some of the chief attractions of the place but to see them under particularly lucky circumstances. I suppose the next best thing to actual travelling is to make plans for more travels or to travel over in retrospect the joys of other journeys, and as I go over again very rapidly the pleasures of last year's trip, I hope you will catch something of the delights that come to those who are able to see with their own eyes places and peoples that must often seem to be only names in the atlas, and perhaps even to gain some fresh idea of the great world. Although I returned to India last October I can truly say that my journey round the world is not yet finished. What I have seen and heard is only the framework into which I hope to fit a great deal more knowledge, and the lines of interesting reading that have been opened up by even the brief glances I was able to obtain will keep me travelling, at least in mind, until I can manage to carry out my plans for another voyage. That I find is the worst of travelling—the more one sees the more one wants to see, and it is only when one is really in another land that all its fascinating possibilities become known. But swift as modern transport is, we must go faster than any present known means of conveyance if we are to go round the world in an hour. I propose therefore to show you a selection of illustrations procured along the route we followed, with only the briefest glance at cities and countries that would well repay years of study and contemplation.

From Madras we went to the familiar Victoria Terminus in Bombay in order to embark on the Anchor Line vessel, *Tuscania*. I need not say anything about the voyage—it followed the familiar route across the Arabian Sea direct to Port Said. As soon as we were on board, we felt we were already in Scotland, for the ship

and her crew came from the land o' cakes, and after one or two of the company's sumptuous meals, we gave ourselves up entirely to creature comforts. Very reluctantly we left the care of the Anchor Steamship Co., at Port Said and took train to Alexandria, a city which bears one of the world's most illustrious names. The railway journey from Port Said to Alexandria is interesting, following as it does first the Suez Canal and then the line of the sweet water canal, just a narrow strip of fertile country snatched from the encroaching desert. As the crow flies, Alexandria to Port Said is a very short distance, but the great salt swamps and backwaters have to be avoided. Alexandria has two beautiful bays, one of which forms the harbour. The shoreline of the modern city is not unlike an American town in appearance, with its regular high buildings. Here was this wonder of the ancient world, the Pharos, or lighthouse. It is believed to have stood where an old fort now occupies one horn of the beautiful crescent-shaped bay. The fort was being renovated when I was there and is preserved as an ancient monument. The old quarter of the town is very little different from the bazaars of any Indian city, save that the fez is much more in evidence everywhere, as it is regarded as the national head dress, and not specifically Mussulman.

From Alexandria we took the train to Cairo, another blend of ancient and modern, with its modern shops and cinemas, and its mediaeval bazaars. I must not linger here, though the temptation is great. One whole day we gave to the treasures of the Museum, a museum so beautifully and clearly arranged that it was easy to walk down the corridors of Egypt's long history, from the liveliness and naturalness of her early art, to the decadent magnificence of Tutankhamen. Beyond Cairo were the mighty pyramids and the eternal riddle of the Sphinx. A good deal of excavation has recently been done and you will see that the feet and the tail of the Sphinx are now visible. From Cairo we started off in an army truck to tear along the great new road that encircles the foot of the Pyramid and leads away across the desert. It was hot and it was dusty, and there was nothing to see but drifting sand, waging an endless battle with the engineers whose duty it is to maintain the road, but at last a line of green burst upon us as we crossed an irrigation canal into the rich province of Fayum. There was no transitional area. Behind was burning sand: before us were the canal banks, lined with trees and rushes: beyond them we entered a land of crops and villages. Fayum is held to be the most fertile province in Egypt—even olives are grown here. It is not an oasis, but an area irrigated by canals from the Nile, with

a big inland lake of salt water which forms the drainage of the area.

The houses make an interesting commentary on the climate, for the roofs are ramshackle in the extreme, while the earthern pots you see on them are the family grain stores. Beyond the lake is desolate country, the haunt of jackals and hyenas, and beyond that again is the desert. But the lake is busy with fishing boats —though it is subjected to severe and sudden storms.

While in Cairo we heard suddenly that our boat was leaving a day earlier than expected, so we had to hasten back to Alexandria to be in time, leaving the coffee service I was choosing. Egypt is the land of coffee ; the leisurely negotiations in the bazaar, visits to friends or calls of state are all celebrated with coffee. The cups were of brass in the bazaar and silver in the Palace, and sometimes china in private houses, but always tiny and usually without handles, and when of metal were lined with glass. I soon learned that it was impossible to drink more than half the contents, for the coffee is poured in boiling hot and very thick, so that at least one third of the cup remains filled with a thick sediment. However I soon learned to appreciate well-made Egyptian coffee. A glass of water was always served with it.

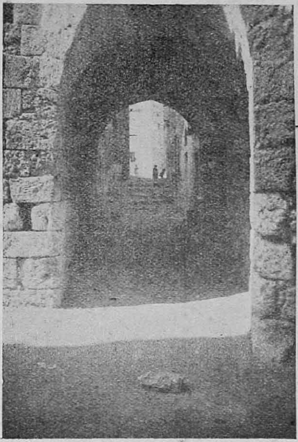
Our next boat the *Egitto*, turned out to be a small Italian boat, with a big portrait of Mussolini, and very little deck space, most of which was occupied by large motor tractors and other cargo. As we cast off the last thing I noticed on the dock was a notice board forbidding football on the quayside. I should not have thought there was room for even the shortest game without all players finding themselves in the water, but evidently the football enthusiasts of Alexandria do not worry about the size of their pitch.

Our voyage in the *Egitto* did not begin very auspiciously. It was raining when we left Cairo, and it was still raining when we went on board at Alexandria, and soon we found ourselves in a storm. When we woke in the morning we were still safe in our respective bunks, but everything else in the cabin was in disorder, and the floor was a medley of suitcases, life jackets and other articles that had been tossed together from different parts of the room. Once in Port Said we had a respite from the waves, but when we got out into the open sea again our troubles were by no means over. In the meantime a host of Yemenese Jews had come on board in long cloaks and orthodox side curls, clutching every variety of household and personal effects. They made themselves comfortable in the centre of the

ship, while strong odours of garlic came to the passengers above, and perhaps added a little extra flavour to the macaroni which was our daily portion. No one could converse with them, save for one or two boys whose smattering of English was almost too limited for serious talk. One could only imagine the discomforts and privations of the long journey from Arabia, the fears and hopes with which they were bringing their wives and children, and their poor bundles of possessions, to start life again in a new country. Whatever else they had had to leave, most of the men managed to get their hookahs on board. Before landing in Palestine these Jews had to submit to a very searching medical examination. Each one was vaccinated and inoculated, so that at least they might make a good start. As we tossed in the Mediterranean I clung to the ship's side and calculated hopefully how soon we should be in Jaffa. Jaffa exported oranges, I knew so much—but I had not realised it had only an open roadstead and no harbour. So when we arrived we cast anchor and had to wait among the billows until a boat should be able to reach us. Only after four hours did the sea subside enough for the doctor and other officers to come on board, and hope deferred this time made more than the heart sick! At last we were off again and were soon safe in the beautiful harbour of Haifa.

Haifa is under the British Mandate and a fine modern port and city has grown up. The harbour police spoke with the familiar accents of the London "bobby." Beyond the harbour a new town of residential houses climbs Mount Carmel, and a good service of trams and buses will take one to the Panorama Road, from which a lovely view is obtained. The harbour and docks are noticeable for their cleanliness, and the whole town would stand comparison with any city of England or America. But I cannot stay to describe Haifa and the beauty of Carmel. As we wandered looking for the famous view we fell in with a young man employed in the Western Tel. Co., who was also taking his daily walk over the hill. He had already seen us in the tram. We joined company and walking down into the town again with him as guide, took train to Acre. Here again history came to life—Acre, whose "honey-coloured ramparts" with their feet in the sea echoed to the sound of Crusaders' trumpets and saw Napoleon's army turn discomfited from their strength. But Acre was old before the knights of St. John of Jerusalem made it their headquarters and gave it their name: it was old even when Cleopatra ruled it or Pompey made it a Roman seaport. It was old even before the first Israelites came into the land, for it is recorded that they were not able to capture it. Who can say when first this city, so quiet

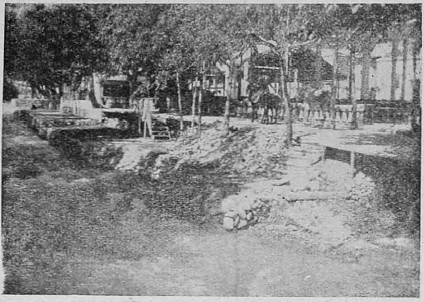
now and so full of memories, first became alive with activity, for it was important enough to be mentioned among the cities captured by the Pharoah 3½ milleniums ago whose names are inscribed on the temple of Amen at Karnak in Egypt. But there is no time to tell now of the ghosts I met in those haunted ruinous lanes. Our friend took us to an Arab restaurant built in the thickness of the old wall and we ate Arab bread and tasty dishes which he chose for us. The next day we left Haifa and soon came to Bey-



The Battered Walls of Acca.

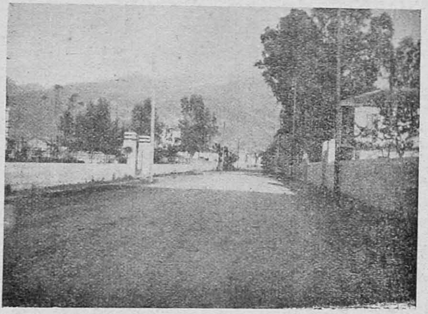
reuth. This time it was the French flag which fluttered on our ship. As soon as the Company's agent came on board to check cargo we were free to go exploring. Judge our surprise when the local agent of the Italian Steamship Co., proved to be a Punjabi Mussulman! His father had served in Syria during the war and had settled and married there. We suggested that he should celebrate our visit by taking a holiday and spending it with us. Fortunately he was able to take a holiday and we hired a car and set off for Damascus. This is not the time to describe the magnificent French military road which runs straight across Lebanon and Anti-Lebanon into the fertile surroundings of Damascus nor can I stay to describe Damascus, "the oldest living town in the world" as it has been called. On our way back we turned aside to a delightful little health resort in a cleft of the mountains, where

we sat under the pussy willows beside a mountain torrent and ate a Syrian lunch. Too soon we had to hurry back to join our ship. The road to Damascus had taken us beyond the boundaries of the French Administration into the Syrian Republic and our next halt



In the Lebanon Hills—A Holiday Resort.

brought us into yet another territory, Alexandretta whose political fate has recently been amicably settled. Alexandretta is now the port of Antioch, whose mouldering and lonely ruins can be visited by car but I did not feel attracted by a wild rush in an

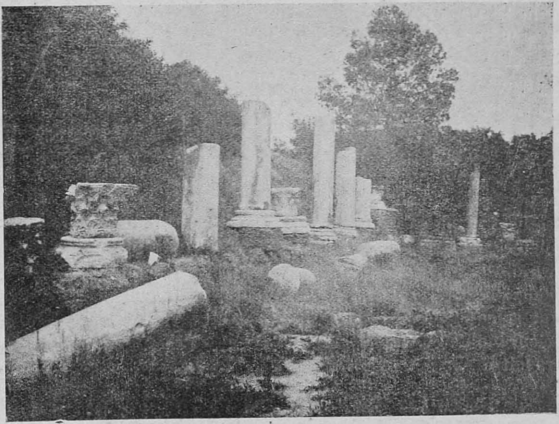


Alexandretta.

antiquated car over no one knew what sort of roads, so we lazed away the long summer day in what must surely be the true land of the lotus-eaters. It is a beautifully situated little town as you can see, with the mightly walls of the Taurus Range enclosing it.

The only sign of energy we saw was a carpet seller with a few rugs, but no one showed any interest in his wares and so he spread his carpets among the roses and went to sleep. So the quiet hours passed and we sauntered along the deserted road, loitered over our coffee in the cafe on the sea front and watched our ship mirrored in the glassy surface of the sea and as the shadows began to fall we went again to sit in the garden of roses. Perhaps it is the women who do the work in Alexandretta, so that the men may have all day to sit over their cards and their coffee in the restaurants along the Marina.

Mersin was our next port of call, and here we got rid of our tractors at last and had a little deck space. Long ago a mighty city dominated this coast, when Tarsus was the outlet for all the produce of the Cilician Plain. Now its duties are performed by this quiet port—an outpost of the Turkish Empire—and the great trade and greater glory of one of Rome's most important provinces have passed into the realm of forgotten things. From Mersin we took



Salamis in Cyprus : One of Rome's greatest cities, now lost in the jungle

our way by one of the world's oldest shipping routes and came to Cyprus. Once again the Union Jack fluttered at the mast head. There is so much I could tell you of Cyprus—the beauty of the scenery, the deliciousness of its oranges, the marble columns of

its days of Imperial greatness, deep buried in the silent jungle, the wonder of its mediaeval remains—again we were following the Crusaders, for here Richard the Lion Heart of England was married to Berengaria, and the proudest families of Europe lived and ruled with a magnificence that can scarcely be imagined—Famagusta, city of churches, with its wonderful walls. If only some millionaire would come forward and redeem these lovely ruins as Italy has done for Rhodes! Cyprus would give material for a whole series of lectures and then not be exhausted.

The Mediterranean seemed to be getting tired of her peaceful ways when we left Larnaca, but soon we were back again on the coast of Turkey lying off the little known port of Antalya, or Adalia, as it is in some atlases. The first thing the Turkish policeman on the quay did was to confiscate all our cameras, and by the time we got them back by an appeal to superior authority it was too late to use them effectively. The reforms of Kemal Pasha do not seem to have reached this distant spot. Like many another of these seaports of Asia Minor, Adalia formed part of the Empire of the Crusaders, and it has Roman and Greek ruins as well. But there is no one to care for these things and the town continues in its shabbiness and decay. But above the sheer wall of cliffs with its many waterfalls tumbling down to the sea was a wide space carpeted with Spring flowers, with nothing to disturb save the sound of the waves below. Camel trains from the interior were passing through the untidy town but here everything was fresh with the coming of the Spring. Of Rhodes, the Island of Roses, our next port of call, I can only say that if you would like to know just how mediaeval Europe lived, walk down the Street of the Knights, and except that underfoot it is cleaner than I believe any town of those days ever was, you will be walking straight into the Middle Ages. The Italians, who now rule in Rhodes, have spent large sums of money and with wonderful taste have restored the ancient buildings, so that it is possible to see Rhodes as the Crusaders left it.

The Italian flag came down and we passed the twin pillars surmounted by the wolf and the stag, symbolic of Rome and Rhodes, out of the beautiful harbour and into the Mediterranean at its worst. No wonder the people of old, with their tiny ships, did not love the sea, and the poet-prophet on his lonely island dreamed of heaven as a place where there shall be no more sea. As we threaded our way among the scattered rocks and islands of the Grecian Archipelago, half lost in mist and driving rain, and

saw the waves breaking round them, I well understood how an indefatigable traveller like St. Paul would be able to record that he was often in "perils of water," and as he so vividly says of himself, "a night and a day have been in the deep". Once indeed our own ship's course had to be changed with a suddenness that threw me out of my chair and across dining saloon, and we were very thankful when at last, like the mariners of ancient days, we came in sight of Cape Sunium, and finally were safely anchored in the harbour of Pireus.

And what shall I say of Greece? To a Westerner, brought up in the traditions of European culture, to come to Greece, from whatever corner of the world, is in a sense to come home. For to the marvellous race that built the Parthenon and gave us the philosophy of Plato, the teaching of Socrates, the language of the New Testament, we owe all that is best in our religion, our philosophy, our art. And when the springs of life were very low at

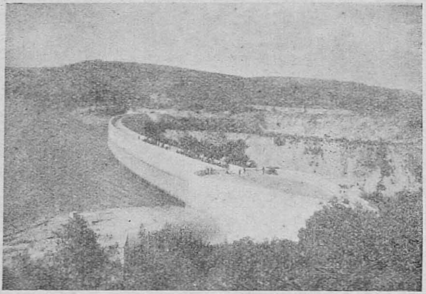
Temple of Poseidon—Cape Sunium.

the close of the Middle Ages, the rediscovery of Greek brought a revivifying stream of culture that made possible the great Renaissance of Learning and the Reformation of Religion. Proportion—that seems to have been the secret of Greek art. Everything fits so perfectly into its place. And above all is the blue sky and an

atmosphhre so marvellously clear that each building, each tree, each work of art, stands out with the clarity of a jewel. It was a wonderful good fortune for us that our arrival coincided with the Centenary Celebrations of the University of Athens, and as guests

Greek Folk-dancers in provincial costumes.

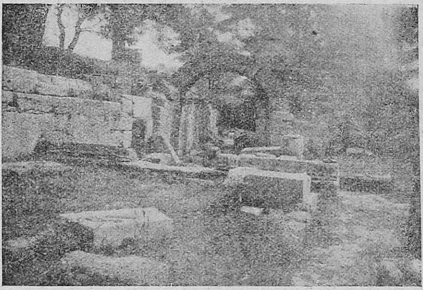
of the University we were privileged to see many things that one might live in Greece for years without having the opportunity to see. We went to one of the loveliest spots to be found anywhere the ruined temple of Poseidon, standing against the sky on the headland at Sunium, with a drift of blue flowers at its feet, and



Lake at Marathon, supplying drinking water to Athens

below the blue unruffled sea. It lies beyond those silver mines of Laurium, which paid for the fleet that smashed the mighty host of Persia at Salamis, and long ago Greek sailors for Piraeus would look for the glint of the sun on Poseidon's temple and confidently

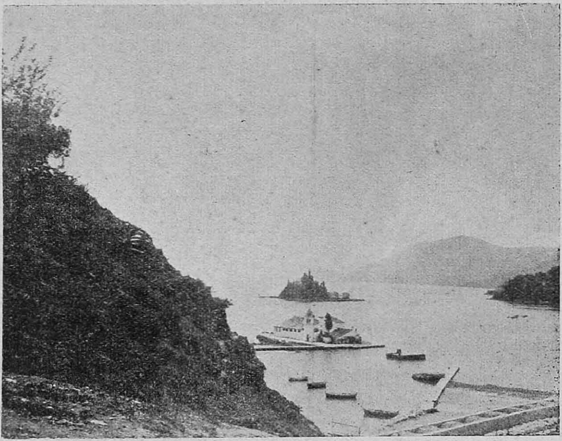
steer their course for home. I have no lovelier memory of Greece than this noble ruin with the islands set like emeralds in a sea of blue. Below the temple as we sat at lunch we were entertained by an exhibition of Greek folk dancing, with charming mediaeval costumes representing every province of Greece a very pretty sight indeed. Modern Athens is proud of its water supply, which is said to be the best in Europe and we were taken to see the great lake of Marathon which has been created by a new dam across the river not far from the historic battlefield. It reminded me somewhat of Periyar, though the landscape is gentler and more open than the dense jungle of the Travancore Hills. There was much to see in Athens, and we spent some happy days there, though we shall still find plenty more to see when we visit it again. For no one could leave Athens without a vow to return at the first opportunity. I cannot stay to tell you more of Athens—of its beautiful modern streets and squares laid out on a definite plan, of the smart shops—Athens sends shoes to Paris!—of the fine parks and gardens or the wonders in its museums. And I must leave the glory of the Acropolis for it seems a sacrilege to try to express in a sentence the birthplace of civilisation as we in Europe understand it. Many towns beckoned to us, with the charm of the Greek countryside



Entrance to Stadium—Olympia.

or the call of antiquity, but our stay had to be limited if we were to reach England in time for the Coronation. But we took train for Olympia, a tiny village hidden among hills, with a tiny Museum, but what a house of treasures! Here the Olympic Games were first held, and in the ground can be seen still the line from which the foot-runners started, the Olympic Games, judged of so much importance that dates were reckoned by them and contend-

ing armies ceased their strife so that the best athletes would not be prevented from attending. The world has travelled far from those distant days. Who shall say whether it is forward or backward ? In the little museum, in a room by itself stands that treasure of art, the Hermes of Praxiteles, found among the ruins of the great temple of Zeus. But great as are the charms of this wonderful piece of sculpture, I liked better to gaze upon the broken fragments of the pediment of the West Front of the Temple, depicting the fight with the Centaurs, with Apollo, deification of law and order, in the centre, surely one of the noblest conceptions of the Divine that has even been executed by the hand of man. From Olympia, with its one hotel looking out over the circle of hills, where the nightingales would hardly let us sleep, we went back to Patras, a quaint little port, one of several such ports in the landlocked sea. Here we took a Greek steamer for Corfu, possibly the most beautiful of the Greek islands, though with so many lovely islands it is difficult to single out any one as pre-eminent. It was the Greek Easter, and the boat was late, for it was full of excursionists from Athens



Nausicca's Island—Corfu.

and Corinth, going home for the holidays, and frequently bringing the Easter lamb with them. We were all night on board, and reached Corfu only in the morning.

It was a fascinating journey, from island to island, with names that spelled romance. Here was Ithaca, the home of Ulysses, where we stayed for a few minutes. At Preveza, we made a longer halt, and were able to walk along its quaint streets and even sit for a little while and eat a spoonful of sweet jam and drink a glass of water under a tree by the seaside. At last we came to Corfu in the sunshine, and were back in mediaeval Venice—for the great fleets of the Mistress of the Adriatic once ruled all these seas. The narrow ways between the tall houses were gay with flags, for

Street in Corfu

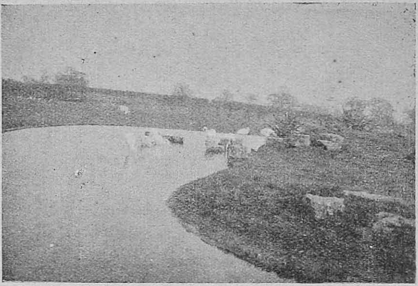
Easter is a national festival in Greece. All Corfu gathered for the processions and with the banners fluttering from every window, the rich robes of the ecclesiastics, the medals and gold lace of the naval and military officers, and the picturesque colours of the Corfu national dress, the sunny island presented a very gay appearance. We drove out to some of the beauty spots of the island which has been a favourite with the wealthy and the leisured for so many years and we were sad indeed to leave its friendly shores, though the good ship Cephalonis which was to take us to Brindisi looked very festive in her Easter dress.

Not even the foot high letters painted on walls and buildings all along the railway line announcing the greatness of the Italian Empire and the man who had made it could tempt us to linger in

Italy. The journey from Brindisi was very pretty, the railway almost touching the blue Mediterranean. At Turino we had to change trains, and in the interval we walked into the town to stretch our legs a little. Crossing the Alps we saw glimpses of the beautiful country side, with the snow still on the mountain peaks. The railway ascended the river as it flowed Eastward into Italy, and the magnificent ghat road that links France and Italy followed the same line. We passed through the great Mont Cenis tunnel, and when we emerged we were following a river westward and we were in France. At Paris we had to change again and cross the city to the Northern station. Here we took train for Dieppe—every possible passage by the shorter route from Calais to Dover had been booked for a fortnight ahead. The Channel was not in her most smiling mood and we and our packages on deck were well soaked by the spray and the waves which constantly washed over us. It was chilly too after the sunny skies of Greece, but after all it is only a crossing of three hours and we were on the shores of England.

It wanted only a week to the Coronation, and nearly the whole train had been reserved by one party, so that the railway authorities were at their wits' end to find accommodation for all the rest of the passengers. We had left the early Spring in the Mediterranean countries, and here in the South of England we caught up with Spring again as we passed through beautiful Sussex towards London. It was eight years since I had visited England and I noticed many changes. London is changing rapidly, and I think is losing much of her charm, but perhaps I am prejudiced too much in favour of the old ways. Many big blocks of flats and offices were in course of construction, and the fields and hedgerows on the outskirts of London which I had known since childhood were replaced by thousands of houses. A new industrial area has grown up to the west of London and to the student of economic geography this shifting of industry and development of a new type of industrial area is very interesting. More than once I was completely lost in roads that I had known intimately for many years. But England was actively preparing for the great events of May 12th and the old city of London, that square mile that never seems to change much, was very beautifully decorated. As we went about the country, we found every tiny village and remote township in festival dress, while the magnificent decorations of Oxford Street gained world-wide fame. As the time grew nearer it was hardly possible to move in the streets of London and all sorts of special arrangements had to be made. People of every race and nation were to be met with, and the control of traffic during the period

of the Coronation was a triumph of organisation. I need not detain you with descriptions of the activities of May and June. Everything possible was done to make guests from overseas feel at home in England, and it was impossible to accept all the invitations that come to us. We bought a car in London and so were able to cover a good deal of country. I will show you just a few pictures, though the countryside of England, rich as it is in beautiful surroundings and historical associations, is an inexhaustible theme. Just as the central part of the Coronation service has come to us unchanged from the coronation of the Saxon Kings more than a thousand years ago, so the centuries jostle each other in the quiet cathedral cities and sleepy country towns of England, and at every turn one is tempted to linger. As time is short I have chosen just a few contrasting pictures to show some of the varied scenes we passed on our motor runs during the two months we spent in



In the Zoo at Whipsnade.

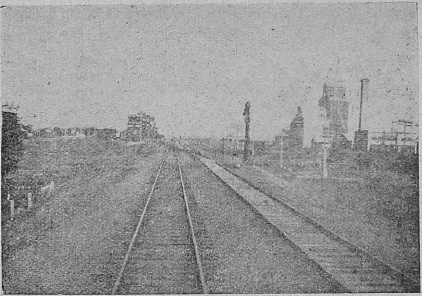
England. Here is a beautiful old farm house in Sussex, where we spent a night—the date of building is still to be seen over the door. We were on our way to Devonshire through some of the loveliest scenery in the South of England when we halted for the night in this village. Of Devonshire and its beauties you must often have heard. This was my first visit, and when I first found myself driving a car in the Devonshire lanes I began to think it was the easiest way to a nervous collapse. Big buses come up and down these steep hills and I still remember with gratitude that I never met one as I was ascending one of these unexpected gradients, with no room to pass or turn. We spent a few days in beautiful Somerset, and while there visited ancient Glastonbury. From Somerset to Plymouth we passed through some delightful scenery, passing

Exeter Cathedral, the glory of the West Country, and crossing Dartmoor where we spent a night at Princetown. Of course, gardens were at their best everywhere in June, and we saw some lovely gardens indeed. Here is a very pretty rock garden in a private park in Essex. Of course we went to the Zoo at Whipsnade which was opened since my last visit to England. One corner of London I made a special effort to visit. Those knights of St. John whose order was founded in the ancient city of St. John of Acre in the days of the Crusades came at last to London. When first Palestine, and then Cyprus and Rhodes were lost to the Crusaders and their magnificent dreams of Empire came to nothing, the Knights of St. John of Jerusalem continued to hold their chapters in this old building, and St. John's Arch, in Clerkenwell, and the ancient church near by, is still in their possession.

From London we went Northward and threaded our way through the ancient gates of York City and saw the ruins of Whitby Abbey. And from there through the lovely Yorkshire Dales we made our way to Liverpool and our days in England drew to a close. On July 7th we left England by the C. P. Steamer, Duchess of Atholl, taking the northerly summer route to the St. Lawrence. I had forgotten how cold it might be in the North Atlantic and when we found ourselves in a field of icebergs there was a chill in the air that I had never experienced in my life before. However, it was thrilling to see those great masses of floating ice, melting into fantastic shapes, gleaming with a wonderful cold translucent colour, while the bitter wind blew down from the coast of Labrador. We came into the St. Lawrence, and hour by hour the beautiful landscape floated by, with the charming villages and lonely farms of the old French type. The old fort of Quebec still dominates the river and not far away we saw evidence of the lumber and paper-making industry. The ship took us as far as Montreal, a distance of nearly five hundred miles up the river. We spent a day in looking round the city. It seemed strange to land in Canada, a great British Dominion, and see all round us the evidence of French language and culture. Montreal is the centre of French Canada, and while the shop signs and public notices were displayed in French, we could not doubt that we were in Canada, for Canadian cities have a character of their own. The residential parts of the town were beautifully laid out. A feature of Canadian towns that lends much to their sense of spaciousness is the absence of enclosing fences to the gardens. Every house has its own surrounding plot of ground, no house is allowed to occupy almost the entire plot as is done here, and so the general impression is of a park with houses. There is no wall between the road and the

garden in front of the house and no walls between the front gardens themselves. But then of course goats and cattle are not given the freedom of the streets as they are here.

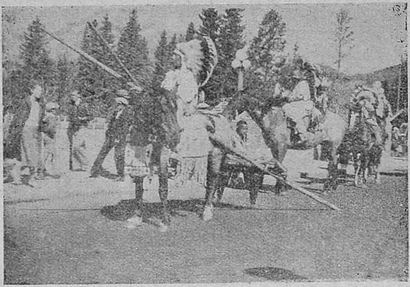
In the afternoon we went for a drive along the St. Lawrence passing the old elongated French farms. The French farmer divides his land among his sons, and as each farm requires an outlet to the road, the plots have become smaller and smaller in the course of generations, but they have also become narrower and narrower in proportion to their length. That evening we took the C. P. train, the Dominion, which would bring us to Vancouver on the Pacific Coast by the fifth day. We travelled very comfortably in a sleeping car. The route beside the Great Lakes was very pretty indeed. We stopped for an hour or two at Winnipeg and were able to go for a walk. It was cruelly hot on the prairie, but when the train



A typical prairie view—with small grain elevators beside the railway.

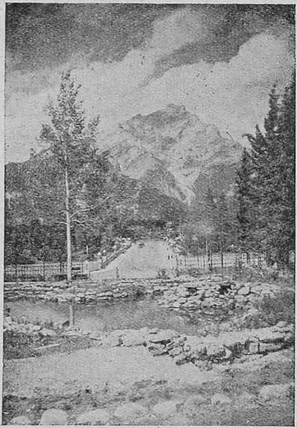
stopped great blocks of ice were put under the cars so that the air inside had to pass over them. Consequently the trains were very cool, in spite of the heat outside. When the distance from East to West is so great, a uniform time cannot be maintained, so we had the experience of arriving at Fort William at 10.35 in the evening, and after a halt of ten minutes of leaving again at 9.55, changing from Eastern Time to Central Time. After travelling 1674 miles the clocks were again put back 45 minutes. Pacific Time began as we descended the mountains towards the coast, and again the clock was put back 45 minutes. We broke our journey at Banff, and spent a few days in that delightful holiday resort. Banff is a small town situated in one of the great parks and animal sanctu-

aries of the American Continent. Unfortunately for photographers; the wild creatures of the forest prefer to come out at dusk, and my



Red Indian Chiefs parade at Banff.

photographs of bears, moose, elk and other animals were failures. The transcontinental train was stopped for a few minutes at the



In Banff National Park—Canadian Rockies

Great Divide, where a single stream divides into two branches, one flowing East and One West. We left Banff at midday, and reach-

ed Vancouver by 9.20 the next morning, having crossed the mountains by one of the most wonderful railway systems in the world.

Vancouver is a charming city, with a wonderful landlocked harbour fringed with islands and a background of forest clad mountains. From here we had a delightful trip across the State boundary and up Mt. Baker, far above the snow line, where we had a magnificent view of glacier-cut valleys and an unbroken snow field. Another slightly longer trip into the United States was to Seattle a typical American city. We spent most of the day in the University of Washington, which is outside the city. This journey we did by motor bus, and found it very interesting, following as we did the coast, between the sea and the coast range, with beautiful glimpses of snowclad peaks. All these coastal cities have quite a large Oriental population. At Vancouver we went over a big salmon canning factory. It was interesting to note that while most of the fishing was done by Japanese, the men in the canning factory were Chinese, with some Japanese and some Canadian girls. In Vancouver, or rather just outside in the Fraser Valley, is a colony of Sikhs, who have settled there as farmers. Vancouver has some of the largest grain elevators on the Continent, as well as an important lumber trade and the canning factories already mentioned. The surrounding country is rich in orchards, and we noticed the typically steeply pitched roofs of the farmyards and store houses, very necessary where deep snow often falls. Although Vancouver is the most important industrial centre in the province, the administrative capital is Victoria, described as the most English city to be found outside England. Our Pacific steamer only called there for a few minutes and the city proper was too far away for us to visit it.

From Vancouver we sailed across the Pacific to Honolulu, the great harbour and naval base in the Hawaiian Islands, discovered by Captain Cook and now administered by the U.S.A. The main industry of the island is the growth and export of sugar, with pineapple growing and canning as second in importance. It is not easy now to see the old time customs of the islanders, for under the United States Govt. prosperity and civilisation have changed entirely the face of the country. But the people retain their laughter-loving ways, and the Hawaiian Islands draw a ceaseless stream of holiday makers. There is much of interest to the geographer in the natural features of the country, such as the hot springs and volcanoes, in the various crops and their distribution and the important industries. Many of the plants and trees we are familiar with in South India flourish, the hibiscus being a

special favourite, and the roads are lined with rain trees, gold mohurs and casuarinas. The Honolulu Aquarium, with its tropical, many-coloured fish, is world famous, and is the only rival to the Madras Aquarium. The largest proportion of the inhabitants of the islands are Japanese. The Chinese, who emigrated there as rice farmers, are becoming fewer in number. The airmail from U.S.A. to Manila and thence to China now regularly calls at Honolulu, and the great China Clipper came over our ship as we lay in harbour.

It was only after we left Honolulu that we heard definitely of the trouble in China and that passengers would not be allowed to land in Shanghai. As we were due to leave the boat at Yokohama, this prohibition did not affect us at the time and we still thought that after we had left Japan we might get a glimpse of China. Japan is a wonderful country; wonderful in its lovely scenery, in the development of its cities and wonderful in the innate artistic sense of its people. Unfortunately the country is now in the grip of a military clique. Two things seem to terrify the authorities in Japan; the first is that visitors should take books in, the second that they should take photographs out. To be on the safe side I left my cameras sealed in the Customs Office, so that when a detective came to us on the train just as we were going to leave the country I was able to say that so far from having any photographs, I had not even a camera. To be without my camera spoiled much of my enjoyment of the country. A French novel in my baggage worried the Customs Inspector very much—being hardly able to read English and at the same time having to cope with the enormous forms which had to be filled in by every visitor, especially the form requiring a description of every paper, book or manuscript carried, I felt quite sorry for him. After turning it round in a puzzled way, he decided to let it pass. Tokyo, where we spent most of our time, was dreadfully hot. It is the second city in the world for size, and population, and has wonderful shops and streets. I was never tired of the Japanese shops, for though their big department stores are on the American model, there is a touch of pure Japanese artistry that gives them a character of their own. In Tokyo we stayed in a Japanese inn; it is not any cheaper than a first class European or American style hotel, but it was an interesting experience and we greatly enjoyed it. We were fortunate in our Japanese friends and so were able to go about and see a great deal of the life, at least in the cities. Of course we saw Mikimoto's famous pearl industry, and I was presented by the firm with some nice pearls as a memento. Everywhere we met with great kindness. From Tokyo we went on to the capital, Kyoto,

with its wonderful temples. I wish I could stay to tell you of Japanese architecture, the beautiful situation of the temples, the lovely views and especially of the marvellous cleanliness of the country. In this last respect probably the greatest contrast with Indian cities is to be noticed. We travelled by train to the last port in Japan at which our steamer could be boarded. It was not the most comfortable voyage I have made, nor yet the cheapest. There is not much competition for passenger vessels between Japan and the Middle East, and so I suppose the much praised Japanese boats we hear of are those that ply between India and Europe. The officers on the ship were obviously anxious, and all the way to Hong Kong we travelled without lights, while we followed the route round Formosa which kept us far away from the coast of China. It was only when we could obtain English papers in Hong Kong that we could know anything of what was happening. The Japanese newspapers and wireless only gave information so fantastic that it was obviously false. We were glad to reach Hong Kong, though our stay there was brief. I had no idea it was such a beautiful island. We drove out to the famous Repulse Bay hotel with its wonderful view of hills and sea. By staying in Japan we had missed a terrible typhoon, and in Hong Kong harbour we saw evidence of its fury in shattered junks and unroofed houses, and the pathetic sight of fine passenger vessels high and dry on the rocks. From Hong Kong to Malaya is not a great distance. In Singapore we saw the beautiful gardens, and enjoyed the hospitality of an Indian merchant in his new house in the suburbs. Both in Singpore and Penang we saw the waterside kampongs of the Malays, and received evidence of the mixture of races that is found in the Peninsula. The police are mostly Sikhs and there are many Indian shopkeepers. Chinese shopkeepers are also in evidence, while Japanese are very numerous. The rice-growing areas are now reserved for Malays in British Malaya, and land is granted to applicants who can furnish evidence that they will be able to cultivate it within a given period. Malaya, like Honolulu, seemed in many respects like South India, especially the West Coast, in its wealth of vegetation and the stretches of paddy fields.

From Penang we crossed the Bay of Bengal and came to Colombo, and as soon as possible took the train for the last bit of journey back to Madras. We had started from Bombay and travelled West, and we had come back to India having gone right round the world. It was an illuminating and an interesting experience, and while perhaps such a rapid journey cannot give one a

very intimate knowledge of any region, it does enable one to perceive the likenesses and contrasts encountered on the way, before impressions have time to fade. In such a rapid survey I do not know whether I have done anything more than confuse your minds with a jumble of impressions. We little thought when we set out on a journey round the world that we should find a war blocking our path. The world is becoming smaller year by year, and such journeys are becoming more and more easy. But every point of contact is a possible point of friction. It is easy both to praise and to condemn, with very little knowledge, but the more one sees of the world and the circumstances and conditions of other peoples, the more easy it is to realise that problems exist of which we cannot understand the difficulty. Nations cease to exist for us as entities, and we begin to think of Japan for instance in terms of the smart girls who were the bus conductors and shop assistants who served us so efficiently, of the hard working chambermaids in the hotels, or the courteous professors in the University, of the toiling peasants in the fields. We read of the glory that was Greece, as of something in the dim past, but a visit to Greece shows us that Greece has a wonderful life in the present, and our memories are filled with instances of the honour with which Greece receives the stranger. At once Greece ceases to be a name in a history book, however illustrious, and becomes a crowd of faces, each face the focussing point of some happy recollection of human intercourse. In spite of war lords, we found the world a pleasant place to wander in, and some day we hope to travel some at least of the same roads again.

# News and Notes

This issue contains some more papers read at the Silver Jubilee Session of the Indian Science Congress at Calcutta. It is hoped that *Prof. A. G. Ogilvie's* paper on *the Technique of Regional Geography* would lead to a number of regional studies being made, thereby affording fuller material for the preparation of a good Geography of India.

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*Mr. Tirunaranan's* interesting suggestion that there has been a river-capture in the present *upper basin of the Palar* is highly original and apparently convincing. The theory is worth a careful investigation at the hands of geologists by means of detailed field studies on the spot.

* * * *

There was an interesting discussion at the last session of the Indian Science Congress on *the Teaching of Geography in India,* which was opened by *Dr. S. P. Chatterjee.* What is really an all-India problem—the neglect of Geography and its bad teaching in schools—was argued from various points of view; and the main issues were clarified. A Report of the discussion is included in this number.

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Under the chairmanship of *Mr. T. R. Venkatarama Sastri,* President of the Association, *Mrs. P. S. Sundara Raj* delivered a lecture, illustrated with views on *'Impressions of my World Tour'* at the University Department of Geography in April last. An account of the lecture is published in this issue.

* * * *

At the invitation of the University of Mysore, *a Summer School of* Geography was conducted at Bangalore, which was attended by 54 teachers—mostly lecturers deputed by the University and teachers in high schools deputed by the Director of Public Instruction in Mysore. A few applicants, who were taken from outside the State, came from such distant places as, Poona, Bijapur, Waltair, Travancore, Madanapalle, Salem and Coimbatore. A Report of the School is published at the end of this number.

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We are glad to learn that the Vice-Chancellor of the Mysore University is intending to start Geography at the Intermediate stage as a first step; and with this end in view a lecturer is likely

to be deputed to take the necessary qualification. A progressive State that has made so much of Geography in recent times ought certainly to provide for a University Department of Geography with advanced courses of study in it. We heartily welcome the modest beginning, which is none too soon in coming.

* * * *

Mr. D. Samuel, the District Educational Officer of Tinnevelly, has again utilised the services of Mr. T. S. Sundaram Ayyar, in running another *Refresher Course in Geography* at the Tirthapathi High School, Ambasamudram in April last. 25 teachers from different parts of the district attended the class.

* * * *

*The 8th Geographical Conference* took place at Mangalore on the 19th, 20th and 21st May last under the Presidency of *Mr. C. J. Varkey, M.A.*, Parliamentary Secretary to the Minister of Education. A Report of its Proceedings, including the thoughtful and stimulating Presidential Address as well as the several papers on South Kanara District, read at the Conference will be published in the next issue of the Journal.

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On the 22nd April, the day after the Conference was over, the Secretary of the Association led a party of about 20 teachers on a full day excursion by bus from Mangalore, visiting Mulky, Malpe, Udipi, Karkala and Mudubidri—going by the coastal route crossing the several backwaters and returning by the interior route. The members of the party, who were for the most part from outside the district, not only enjoyed the tour but got also a real insight into the characteristic features of the geography of the region visited, whose study was made with the help of the one-inch map also.

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It is likely that the next geographical conference will be held at Chittoor in May 1939, when papers on various aspects of the geography of that district will be read and discussed.

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It is regretted that the projected *Kashmir tour* had to be dropped, owing to inadequate response, as the minimum number of persons needed for a bus could not be got. It is hoped to arrange for one next year, irrespective of numbers, before the season is too late.

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Steps are being taken to form an *All-India Federation of Geographical Associations and Societies*, for which a Committee has been appointed with Mr. N. Subrahmanyam as the convenor at a

business meeting of the Geography and Geodesy Section at the last session of the Indian Science Congress at Calcutta. A circular letter enclossing a Questionnaire has been sent widely to persons known to be interested in the cause of Geography in the different provinces and states to elicit and gather information. The Federation will be inaugurated at Lahore at the next session of the Congress in January 1939.

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We are glad to learn that Mr. S. Muthukrishnan, B.A. Hons. (London) has been appointed Lecturer in Geography in the Training College, Trivandrum. Besides being in charge of L.T. Geography, he will also conduct a Diploma Course in the subject with the help of a qualified assistant. It is gratifying to know that provision is thus being made for learning the subject-matter of geography, as well as for learning its pedagogy; and it is hoped that early enough a rule will be made that the former qualification should precede the latter.

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## A NOTE ON THE DESIGN FOR THE TITLE-PAGE OF THE JOURNAL

We have reproduced a design for the Journal on the title-page of this issue, kindly prepared by the talented artist Mr. C. Sivaramamurthy, M.A., Curator, Archaeological Section, Govt. Museum, Madras. The motif of it is Mother India, represented in the Hoysala (Belur) style, holding a sheaf of corn on the right hand and a plough on the left, symbolising agriculture as the main industry of India. The figure stands against a silhoutted plane-map of India on a screen, which stands out from Asia on a hemispherical back-ground. Apart from the symbolic value, we are sure that the great artistic merit of the central figure as well as of the design as a whole will be well appreciated.

# Reviews

*Sind's Changing Map.* By M. B. Pithawalla (The author, Karachi). 1938. Price Rs. 2-as. 8.

Prof. Pithawalla has already made the study and research of the Sind Region his own as is evidenced from the several works of his reviewed in the earlier issues of the Journal. He has supplemented them by this rare and valuable collection of Maps of Sind from various sources, from those of Ptolemy in 150 A.D. to the latest maps of the present day. Especially interesting are the Islamic maps of the middle ages which throw a flood of light on the earlier courses of the rivers and the settlements of the times.

The opening pages contain very important explanatory notes on the maps which close with the findings of the author among which may be noted that "Sind is a changing land of changing river courses, changing delta and changing inlets of the sea, with a changing population and unstable settlements, unstable ports and capital towns due to unstable water supply etc.," and that "Sind has preserved its individuality and unique position" through the ages.

We congratulate Prof. Pithawalla on the achievments of his assiduous labours and commend this volume for its own intrinsic value as well as a model for similar work to be done for other regions.

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*Philips' Pictorial Atlas of the World* (Indian Edition). Edited by George Philip. (George Philip & Son, Ltd., London). Price 1sh.

This is a very instructive and interesting atlas that can be used with great advantage in the lower and middle school stages.

The volume begins with 4 pages of coloured maps and simple diagrams showing "Our Round Earth in Space", the terms used to describe geographical features, what a view looks like when it is translated on to map and how the scale of a map determines the amount of information it can give.

The main part of the atlas consists of a series of maps in colour, with a very simply-worded explanatory reference, each map being accompanied by coloured pictures giving typical examples of the special aspect of Geography it illustrates such as the types of races; mountains, plains and seas; where it is hot or cold, wet or dry; what the world grows etc. The last part is devoted to India itself, treated similarly. Altogether it is a very impressive and instructive atlas, useful for young children—quite attractive, and cheap for the value.

*Chennapattanamu*: (Geography of the Madras City in Telugu). By N. Subrahmanyam. (Longmans, Green & Co., Ltd.) 1938. Price as 6.

This is the Telugu edition of the elementary geography of Madras City, the Tamil version of which was reviewed in an earlier issue of the Journal. Instead of the systematic treatment according to a logical type plan which has unfortunately been in vogue in South India, a new line has been struck of treating the different parts of the City in a descriptive way, bringing out their salient features in simple Telugu. A chapter on Greater Madras and four general lessons—on the Seasons in Madras, How the City gets its Supplies, Transport in the City and Stages in the Growth of the City—round off this interesting little book, written on refreshingly new lines. The bold type on glazed paper, the choice pictures and the neat get-up make it attractive to children.

---

*Exercises in Modern Geography*: Book Six—*Central and South America.* By Coysh and D. M. Hunt. (University Tutorial Press Ltd., London.) Price 1sh.

This is the last volume of a series of Exercise books, some of the others of which have been reviewed in the previous issues of this Journal.

The exercises contained in this book, which are intended for use in the middle and upper forms of schools, are designed to encourage atlas study and the critical examination of pictorial material, and may be used as a basis for individual work. Exercises on diagrammatic representation of statistical data have also been included. The systematic use of such a series of exercise-books in Geography will make the study of the subject real and practical, and pull it out of the rut of bookish rote.

---

*Elementary Mapwork.* By A. W. Coysh and D. M. Hunt. (University Tutorial Press Ltd., London). Price 1sh.

This is a preparatory volume of exercise book on map work leading to the more advanced work contained in *Exercises in Modern Geography* : Book III-Map Reading. It contains exercises which afford a survey of the elementary principles of mapping and map reading and provide the practice which is so necessary in the earlier stages.

The several pictures included in the volume illustrate specific points and enable the pupil, while working the exercises, to visualise the relations between the contour lines and the actual features.

# Books and Journals Received

*Sind's Changing Map*: By M. B. Pithawalla.
*Philip's Pictorial Atlas of the World* (Indian Edition): Edited by George Philip.
*Elementary Mapwork*: By A. W. Coysh and D. M. Hunt.
*Exercises in Modern Geography*—Book VI: *Central and South America*: By A. W. Coysh and D. M. Hunt.
*Geography of Madras City* (Telugu): By N. Subrahmanyam.
*Poland*: *Human and Economic Characteristics in their Geographical Setting*: Birmingham Information Service on Slavonic Countries.
*Social and Physical Anthropology of the Nayadis*: Bulletin of the Madras Government Museum.
*Geography*: March 1938.
*Educational India*: March, and April 1938.
*The South Indian Teacher*: March, April and May 1938.
*Calcutta Geographical Review*: September 1937.
*The Geographical Magazine*: April, May and June 1938.
*The Geographical Journal*: March, April and May 1938.
*The Scottish Geographical Magazine*: March and May 1938.
*Quarterly Journal of the Mythic Society*: April 1938.
*Journal of the Annamalai University*: March 1938.
*The Indian Cooperative Review*: January-March 1938.
*Hungarian Geographical Review*: Vol. LXV—1937 (8-10).
*International Review of the Hungarian Geographical Society*: Vol. LXV (6-10)—1937.
*South Indian Commerce*: April and May 1938.
*The Muslim University Journal*: July 1937.
*Indian Journal of Economics*: April 1938.
*The Geographical Review*: April 1938.
*Brahma Vidya—The Adyar Library Bulletin*: May 1938.
*Indian Journal of Economics*: April 1938.
*Kalaimagal*: May 1938.
*Journal of the Andhra Historical Research Society*: July-October 1937.
*The Ramakrishna Home and Schools Magazine*: March 1938.
*The Indian Educator*: May 1938.
*The Educational Review*: May 1938.
*Akademiya Navk*—U.S.S.R.: *Trudi Instituta Geografi*: Book 28—1938.

# Report of the Summer School of Geography, held at Bangalore in April 1938

The Secretary of the Association has the honour to present the following Report of the Summer School of Geography held at Bangalore in April 1938 :—

At the invitation of the University of Mysore, the Executive Committee of the Association at its meeting held on 12-2-1938, decided to have a Summer School of Geography at Bangalore during April 1938, and authorised the Secretary to organise and conduct the course as in previous years. The conditions stipulated and accepted were that a minimum of 40 teachers was to be guaranteed, the fee for each being fixed at Rs. 15. The University authorities promised to provide all facilities by way of lecture halls, equipment, hostel accomodation, etc. The course was originally arranged to start from the 6th April ; but on the suggestion of the Registrar, owing to several teachers being engaged in invigilation work it was commenced on the morning of the 11th April.

At 10 A.M. on that day the opening ceremony took place at the Engineering College Hall, Bangalore before a distinguished audience of Professors and Educational Officers. Mr. N. S. Subba Row, the Vice-Chancellor of the Mysore University welcomed the lecturers and the teachers of the Summer School after which Rajamantrapravina S. P. Rajagopalachari, the first member of Council formally opened the School with an address (Vide Appendix A). Mr. N. Subrahmanyam, the Secretary of the Association then delivered an address on Modern Geography. The classes were then conducted as per programme (Vide Appendix B). 54 teachers attended the course (Vide Appendix C); and the following lecturers handled the different subjects as shown below :—

| | | |
|---|---|---|
| 1. | Mr. N. Subrahmanyam | Pedagogy of Geography & Mapwork. |
| 2. | Mr. S. Muthukrishna Das and Mr. N. Subrahmanyam | Climate & Weather. |
| 3. | Mr. George Kuriyan & | Cartography & Surveying. |
| 4. | Mr. K. Srinivasa Raghavan | |
| 5. | Mr. V. D. Krishnaswamy | Land Forms. |
| 6. | Mr. B. M. Tirunaranan | India. |
| 7. | Miss Mary W. F. Waddington | Anthropo-Geography. |
| 8. | Mr. K.M. Subrahmanyam | Economic Geography. |

A major excursion was conducted to Nandi Hill; and visits were made to the following places:—The Government of India Survey Office, Basavangudi and Mt. Joy, Kaiser-I-Hind Silk and Woollen Mills, Government Agricultural Farm, Imperial Dairy Farm, Government Soap Factory, Government Porcelain Factory, Government Industrial and Testing Laboratory, Government Workshop and Bakelite Factory. As a sort of extension work of the Summer School, a series of Public Lectures were delivered at Bangalore (Vide Appendix D).

At 4 P.M. on Saturday the 30th April 1938 the Vice-Chancellor presented the Certificates to the Teachers who attended the course and delivered the Valedictory Address to them. He then entertained the Lecturers and the teachers at Tea. There was a good deal of earnestness and enthusiasm in evidence at the School, which was considered a great success.

Appendix E shows the Receipts and Expenses of the Summer School. The Association is grateful to the Lecturers who were willing to forego their remuneration in view of its present financial condition, and received only their daily allowances and travelling expenses.

Madras,
1st June 1938.

N. SUBRAHMANYAM,
*Secretary.*

## APPENDIX A

### OPENING ADDRESS BY RAJAMANTRAPRAVINA S. P. RAJAGOPALACHARI.

I have great pleasure in being present this morning to accord a cordial welcome to the members of the Geographical Association, Madras who are opening a Summer School which they are holding at Bangalore. During the past few years we have had the privilege of welcoming the members of many distinguished scientific and professional associations at Bangalore. The Indian Science Congress, the Society of Biological Chemists, the Oriental Conference, the Institute of Engineers and others have held their Sessions here during this period. I think this is the first time that the members of the Geographical Association visit us and give us the benefit of their knowledge and experience. Frankly I did not know of the existence of the Geographical Association at Madras. One's idea of a Geographical Association was that its members were mostly engaged in adventurous and superhuman tasks like climbing the Himalayas or exploring the unexplored portions in the world. I was not aware that the Association was taking up the more prosaic but, none the less, useful task of training teachers in the methods of teaching geography in a purely scientific manner. I can assure the members of the Geographical Association that their visit to Bangalore with the purpose of having a Summer School here is very opportune. It is recognized in the State that the teaching of geography in the High and the Middle Schools by the untrained teachers is not of a high standard and that it requires much improvement to bring it up to the level of modern requirements. Just two years ago, the Vice-Chancellor of the Mysore University, who was then at the head of the Department of Public Instruction, proposed to Government to start a Summer School of Geography for the purpose of giving training to the teachers in the State. But owing to lack of funds, the Government ordered that the proposal might lie over. Perhaps, at that time the Departments also did not possess the resources to take up the work by themselves. I am glad to see that the Vice-Chancellor has since been able to persuade the Geographical Association to undertake the work here and train our teachers. Government have sanctioned certain facilities for the teachers to be trained. I hope that as large a number of teachers as possible, especially, teachers in our Training College and Schools will take advantage of this opportu-

nity to acquire knowledge in the modern methods of teaching geography, and impart it to their own students. Even with regard to the original idea of geography as connoting the division of the world into various States, things as you know, have changed very rapidly. The treaty of Versailles introduced new names and countries in the map of Europe and since then there has been a large change in the frontiers of important countries in Europe. Latterly, we have had to re-adjust our knowledge of the European map by the absorption of Austria and it remains to be seen what changes will be made in the near future in our own Continent.

I understand the course of training in the Summer School will be on strictly scientific manner and will run for three or four weeks, the course consisting of the Pedagogy of Geography, Map-work, Diagrammatic methods, Cartography, Land Forms, Climate and weather, and Economic Geography with practical work, I understand also that the course will be conducted by qualified teachers with experience in teaching the subject in their own institutions, and conducting such Summer Schools in other places.

I am sure that this course will be of immense benefit to the teachers in training here and they will impart in their turn this knowledge to their own students in Schools and Colleges. I also hope that the Department will ensure that sufficient number of trained men are available to take the course themselves during the ensuing years. I have great pleasure now in declaring the Summer School of Geography open and wish all success in your endeavours to improve the methods of teaching geography in the State.

## APPENDIX B

### THE MADRAS GEOGRAPHICAL ASSOCIATION: SUMMER SCHOOL OF GEOGRAPHY, APRIL 1938.

### PROGRAMME OF WORK.

| Date. | 1st period. | 2nd period. | 3rd period. | 4th period. | 5th period. |
|---|---|---|---|---|---|
| 11th Mon. | Opening ceremony and Introductory Lecture | | | Physical basis of Geography. | |
| 12th Tues. | Pedagogy of Geography and General Instructions | | | " | " |
| 13th Wed. | | Pedagogy | Physical Basis. | Climatology—Cartography. | |
| 14th Thu. | | Anthropo-Geo. | India | " | " |
| 15th Fri. | " | " | " | " | " |
| 16th Sat. | " | " | " | " | " |
| 18th Mon. | " | " | " | " | " |
| 19th Tues. | " | " | " | " | " |
| 20th Wed. | " | Phys. Basis. | Land forms. | Map work (including 1' map). | |
| 21st Thu. | " | " | " | " | " |
| 22nd Fri. | " | " | " | " | " |
| 23rd Sat. | " | " | " | Local excursions. | |
| 25th Mon. | " | Diagrammatic methods. | | Economic Geography, Mapwork. | |
| 26th Tue. | " | " | " | " | " |
| 27th Wed. | " | " | " | " | " |
| 28th Thu. | " | " | " | " | " |
| 29th Fri. | " | " | " | " | " |
| 30th Sat. | " | " | " | " | " |

Surveying to be done in two batches, one in the morning and the other in the evening, for about 8 days, commencing from the 14th instant.

## APPENDIX C

### LIST OF TEACHERS WHO ATTENDED THE SUMMER SCHOOL AT BANGALORE

*A.: Deputed by the University of Mysore.*

1. S. Gopalaswamy, M.A., Lecturer in Economics, Intermediate College, Bangalore.
2. D. S. Hanumanthachari, M.Sc., Lecturer in Chemistry, Intermediate College, Mysore.
3. T. L. Kasturi Rangacharya, M.Sc., Lecturer in Chemistry, Intermediate College, Bangalore.
4. B. A. Krishnaswamy Rao, M.Sc., Lecturer in Physics, Intermediate College, Bangalore.
5. S. K. Narasimha Murthy, M.Sc., Lecturer in Botany, Intermediate College, Bangalore.
6. C. Prasanna Kumar, M.Sc., Lecturer in Geology, Intermediate College, Bangalore.
7. M. Rama Rao, M.Sc., Demonstrator in Physics, Central College, Bangalore.
8. K. Rangaswamy, M.Sc., Lecturer in Botany, Central College, Bangalore.
9. K. N. Seshagiriah, M.Sc., Lecturer in Botany, Intermediate College, Bangalore.
10. Sri M. Sharadamma, M.A., Tutor, Maharani's College, Mysore.
11. M. R. Srinivasa Rao, M.Sc., Demonstrator, Central College, Bangalore.
12. K. Sripada Rao, M.Sc. Lecturer in Geology, Central College, Bangalore.
13. T. V. Subbaroya Mudaliar, B.Sc., Lecturer in Geology, Intermediate College, Bangalore.
14. N. S. Suryanarayana Rao, M.A., Lecturer in English, Bangalore.
15. T. Thathachar, B.Sc. (Hons.), Demonstrator in Botany, Central College, Bangalore.
16. Sri. M. C. Vedavalli, M.A., B.T., Tutor, Women's Intermediate College, Bangalore.

*B: Deputed by the Department of Public Instruction in Mysore (Bangalore Division).*

1. M. A. Abdul Mallick, B.A., Asst., Govt. Model Urdu Middle School, Sultanpet, Bangalore.

2. M. S. Anantha Ramiah, B.Sc., Asst., Govt. Model High School, Chennapatna.
3. A. Chandrasekhariah, B.A., G.D.A., Asst., S. L. N. High School, Fort, Bangalore City.
4. S. Krishnappa, M.A., B.T., Asst., Govt. Central High School, Bangalore City.
5. H. Krishna Sastry, M.A., B.T., Asst., Dist. Normal School, Shimoga.
6. B. Krishnaswamy, B.A., B.T., Asst., Govt. High School, Malleswaram.
7. K. Lakshminarayana Rao, B.A. (Hons.), Asst., New High School, Bangalore City.
8. M. R. Nagaraja Rao, B.A., B.T., Asst., Govt. Middle School, Chamrajapet.
9. J. M. Narasimhalu, B.A., Asst., Govt. High School, Fort Bangalore.
10. J. P. Paul, *alias* Jaya Paul, S.S.L.C. Trained, Instructor, United Mission High School, Bangalore.
11. G. Rama Rao, B. Com., Asst., Govt. High School, Shimoga.
12. B. Shamanna, B.Sc., B.T., Asst., Dist. Normal School, Bangalore.
13. B. Sundereswara, B.A., Asst., National High School, Bangalore.
14. L. Thimmiah, B.A., B.T., Asst., Govt. High School, Thirthahalli.

C : *Deputed by the Department of Public Instruction in Mysore, (Mysore Division.)*

1. Sri. Amba Bai, B.A., L.T., Asst. Mistress, Empress Girls' High School, Tumkur.
2. R. S. Gopalachar, M.A., B.T., Asst., Maharaja's High School, Mysore.
3. Y. Manjayya, B.A., Asst., Govt. High School, Hassan.
4. T. Nanjunda Sastry, M.A., Asst., Govt. High School, Chitaldrug.
5. C. S. Nanjundiah, M.A., B.T., Asst., Govt. Training College, Mysore.
6. C. T. Ramaswami, B.A., B.T., Asst., District Normal School, Hassan.
7. M. A. Rangaswamy, B.A., Asst., Govt. Marimallappa's High School, Mysore.
8. M. Suryanarayana Rao, B.A., B.T., Asst., Govt. High School, Nanjangud.

9. Syed Ahmed, B.A., B.T., Suptd., Mohammedan Section, Trng. College, Mysore.
10. Mrs. G. Tucker, B.A., Asst. Mistress, Mahila Seva Samaj, Basavangudi.
11. K. V. Doraiswamy, M.A., B.T., Asst., Sri Chamarajendra Ursu Boarding School, The Palace, Mysore.

*D: Teachers directly selected by the Secretary.*

1. P. P. Angappan, B.A., L.T., Asst., Board High School, Kollegal.
2. A. J. Cyprian, B.A., B.Ed., Asst., R.B.A.N.M.'s High School, Bangalore Cantonment.
3. C. Jacob, B.A., L.T., Asst., Training School, Thiruvella, Travancore.
4. M. Jeya Singh, S.S.L.C. Trained, Asst., St. Joseph's Ind. High School, Bangalore Cantonment.
5. A. V. V. Narasimha Moorthy, Matric, Waltair.
6. N. Narayanaswamy, M.A., B.T., Asst., S.L.N. H. School, Fort, Bangalore City
7. Paul Neelappa, S.S.L.C., Asst., United Mission High School, Bangalore City.
8. (Vinayak Nagesh) Ponkshe, B.A., Asst., N.M.V. High School, Poona.
9. D. R. Rama Seshan, Secy. Trnd., Asst., St. Joseph's Indian High School, Bangalore Cantonment.
10. K. M. Ramaswamy, B.A., L.T., Asst., Board High School, Mettupalayam (Coimbatore).
11. V. V. Subba Rao, B.A., B.Ed., Asst., T. H. School, Madanapalle.
12. Y. R. Sundaram, B.A., Asst., London Mission School, Athur, (Salem Dt.).
13. B. S. Venkatramiah, B.Sc., B.T., Asst., Vidyaranya High School, Bijapur.

## APPENDIX D

*Programme of Public Lectures at Bangalore.*

1. Saturday, the 16th.—*The New Arab State of Iraq* by Miss Mary W. F. Waddington, B.A. Hons. (Bristol).

2. Monday, the 18th—*Population and Colour Problem* by Mr. George Kuriyan, B.Sc. (Lond.),

3. Tuesday, the 19th—*India and the Next War* by Mr. B. M. Tirunaranan, B.A. Hons. (Lond.),

4. Wednesday, 20th—*Prehistory in India* by Mr. V. D. Krishnaswami, M.A., Dip. Arch. (Cantab).

5. Friday, 22nd—*The Technique of Regional Study* by Mr. K. Srinivasaraghavan, M.A., L.T., Dip. Geog.

6. Wednesday, 27th—*Some Aspects of the Economic Geography of India* by Mr. K. M. Subramaniam, M.A., L.T., Dip. Geog.,

7. Thursday, 28th—*Geosophy or Geography as Philosophy* by Mr. N. Subrahmanyam, M.A., L.T., F.R.G.S.

The meetings were held in the Chemistry Lecture Theatre of the Central College at 6-30 P.M., on the dates noted above.

## APPENDIX E.

*Income and Expenses of the Summer School of Geography,*
April 1938.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fees from 54 teachers @ Rs. 15 each. | | | | | Rs. | 810 | 0 | 0 |
| Expenses : — | | | | | | | | |
| Travelling & daily allowance of the lecturers | Rs. | 364 | 0 | 0 | | | | |
| Clerical services | ,, | 31 | 8 | 0 | | | | |
| Peons' services | ,, | 14 | 0 | 0 | | | | |
| Printing (Certificates and Invitations) | ,, | 11 | 10 | 0 | | | | |
| Garlands and bouquets | ,, | 5 | 0 | 0 | | | | |
| Stationery | ,, | 13 | 10 | 0 | | | | |
| Stamps | ,, | 5 | 4 | 0 | | | | |
| | | | | | Rs. | 445 | 0 | 0 |
| | Balance | | | | Rs. | 365 | 0 | 0 |

N. SUBRAHMANYAM,
*Secretary.*

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# The Madras Geographical Association

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**N. Subrahmanyam, M.A., L.T., F.R.G.S.**

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**THE MADRAS GEOGRAPHICAL ASSOCIATION,**

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# THE
# MADRAS GEOGRAPHICAL ASSOCIATION

## RULES

1. The name of the Association shall be 'The Madras Geographical Association'.

### Objects.

2. The objects of the Association shall be:—
   - (*A*) To promote geographical knowledge;
   - (*B*) To secure for geography its proper place in the High School, the University and its constituent and affiliated colleges;
   - (*C*) To help to improve the methods of teaching geography;
   - (*D*) To work for a school of geography being started;
   - (*E*) To promote studies about South India from various standpoints.

3. These objects shall be secured by:—
   - (*A*) Holding meetings and conferences, and publishing periodicals and occasional bulletins;
   - (*B*) Organizing geographical exhibitions and excursions;
   - (*C*) Helping in the preparation of geography books in the languages current in the Presidency;
   - (*D*) Forming a central library of geographical literature, and collecting maps, charts, plans, models, slides and instruments;
   - (*E*) Providing for circulation to members, of books, periodicals and other collections;
   - (*F*) And by such other ways as are deemed necessary to effectuate the objects of the Association.

### Membership.

4. The membership of the Association shall be open to all those who are interested in the promotion of geographical knowledge or in the teaching of geography.

5. There shall be two classes of members, honorary and ordinary.

6. Honorary members are those who shall be so elected by the council by the majority thereof present at its meeting. They shall be exempt from liability to pay subscription, and shall have all the privileges of ordinary members, except voting.

7. A person shall become an ordinary member upon the proposal by a member, the seconding by another member and approval by the council by the majority thereof present at its meeting. He shall pay an annual subscription of rupees two, payable in one instalment or in *two* equal half-yearly instalments at his option.

8. Those who pay an amount of hundred rupees in two years become LIFE MEMBERS, and they shall be exempt from payment of any further subscriptions.

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